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1973

Wildlife Reference for Minnesota Youth

Agricultural Extension Service
University of Minnesota

As you use this reference, one of the first things you will notice is the many references made to the State of Wisconsin. The reason for this is that it was produced by the Department of Natural Resources in Madison for Wisconsin use. Although we look forward to having a Minnesota publication, there is a need to have something now. Since the wildlife species in Wisconsin and Minnesota are quite similar we have chosen and do recommend that Minnesota youth use this as a reference in the meantime.

Issued in furtherance of cooperative extension work in agriculture and home economics, acts of May 8 and June 30, 1914, in cooperation with the U.S. Department of Agriculture. Roland H. Abraham, Director of Agricultural Extension Service, University of Minnesota, St. Paul, Minnesota 55101. We offer our programs and facilities to all people without regard to race, creed, color, sex, or national origin.

THE WILDLIFE RESOURCE OF WISCONSIN

MAMMALS

Since the coming of white man, with his curiosity about the animals and plants around him, 78 species of mammals have been recorded within the boundaries of Wisconsin. But his coming spelled doom for 8 mammal species, for habitat destruction and overhunting has extirpated the elk, moose, woodland caribou, bison, wolverine, marten, fisher and cougar. The magnificent timber wolf and the Canada lynx are close to extinction within the state.

Mammals are those animals that are covered by hair and that suckle their young, giving them nourishment with milk from the mother's body. These are the creatures that many people call "animals" in contrast to birds, reptiles, etc. Actually, every living organism that is not a plant is an animal, hence animals are divided into many classes of which mammals are only one class.

On the following pages, we will list all the mammals that are native to Wisconsin plus two which have been introduced (house mouse and Norway rat). The important game mammals and the furbearers will be treated in more detail than the last grouping, the non-game mammals.

We will indicate abundance only very generally, since numbers of animals depend on the species concerned, the locality where it is found and the one making the judgment. The vast majority of kinds of mammals still found in Wisconsin are with us in good numbers, deserving ratings from well above rare to abundant.

Mammals, unlike the birds, are much more difficult to observe in the wild state, since they are very secretive and most of them prefer to be about in the twilight hours or after dark. The careful, quiet, determined person, however, can have good results by stalking or standing along game trails or woodland paths in the early morning or late afternoon, even on a bright moonlit night. Mammals leave abundant characteristic signs and a good woodsman can tell much about "who's been around" after a halfday's walk within an area.

Mammals are important to many of us. The game species furnish sport and meat to the hunter, furbearers provide sport and remuneration to the trapper, non-game species supply food for many more valuable animals, and most all mammals give many pleasant "observation hours" to nature enthusiasts. Some mammals, especially the smaller rodents, cause millions of dollars worth of damage yearly, while others such as bats, shrews and moles are very beneficial since they feed primarily upon insects.

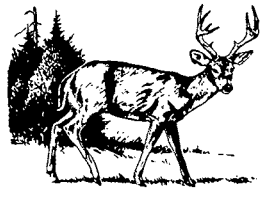
Game Mammals

Game mammals are those mammals that are hunted usually for their flesh rather than their pelts and include relatively few, but very important, species from the small squirrel to the large white-tailed deer and the giant black bear. The woodchuck is included here, although they are given protection since they create ground burrows beneficial to cottontail rabbits.

All of the game mammals are resident the year round in Wisconsin, and are hunted during open seasons in the fall of the year.

(Maps show general distribution and abundance: solid black = common; cross-hatching = fairly common; white = rare or none.)

WHITE-TAILED DEER



HABITAT: Forested areas with much brush, "edge," and second growth. Farm lands with woodlands and marshes with thickets.

POPULATIONS: Not overly common in days of big timber. With timber cutting and burning, increased as brushlands increased. By 1940, overbrowsing of food supply apparent. Liberal seasons reduced them and since 1951, have increased to present.

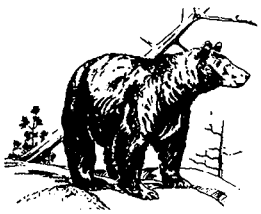
FOOD: Summer — grasses, foliages, twigs, aquatic plants, alfalfa, corn, etc. Winter — browse on twigs and small branches, paw greens under snow.

VALUE: Sport, meat, and trophy value. Sight value for tourists, etc., very high. Av. harvest "either-sex" seasons, 1949-51: 152,000; buck seasons, 1952-1956: 29,000; buck and party permit seasons, 1957-60: 82,000. Serious damage to forest reproduction and cultivated crops when population too high.

MANAGEMENT: Flexibility in hunting seasons to allow regulation of number of hunters and deer harvest in areas when and where needed to maintain sustained harvest, to keep deer within limits of food supply and to reduce forest damage. Good forestry practices to introduce second growth and sprouts where herd reduced.

(Reprinted from Wildlife, People and the Land, 1970)

BLACK BEAR



HABITAT: Forested areas with open fields, marshes and large swamps, best of all with types well intermixed.

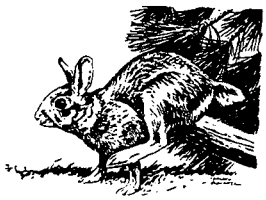
POPULATIONS: State-wide in pioneer times. Very low after deforestatian. Presently a very good population in the northern third of the state.

FOOD: Almost anything edible, but especially fond of fruits, berries and nuts, insects and their grubs.

VALUE: Very important trophy animal. Hunted annually and have been trapped in the past. Av. harvest: 800. Majority of hunters eat bear meat also. Considerable damage by individuals to various cultivated crops, livestock, orchards and apiaries. High sight value.

MANAGEMENT: Practices that keep our forests healthy (fire protection, clear cutting and selective cutting) maintain good bear habitat. Control of "damage' bears where necessary.

COTTONTAIL



HABITAT: Open country with woodlands and brushy areas and semi-open, farmed forestlands. Good cover essential.

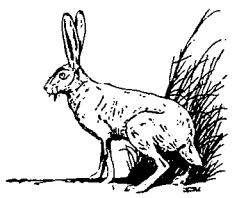
POPULATIONS: In pioneer times not common, but with advent of agriculture, became very abundant. "Clean" farming now reducing cover and rabbits are decreasing in numbers. Reforestation of large tracts also squeezing out cottontails.

FOOD: Grasses, forbs and cultivated crops of many types in the summer. Shrub, tree bark and twigs in the winter. Waste grain.

VALUE: Very important game animal. In good years annual harvest nears 1,000,000 animals. Furnishes excellent sport and very good meat for the table. In severe winters causes much damage locally to trees and shrubs.

MANAGEMENT: Saving hedgerows and brushy areas in farmlands; protection of woodlands from grazing. When possible, construction of brush and rock piles for cover. Lenient seasons essential when populations are high.

JACKRABBIT



HABITAT: Open prairie, or intensively farmed areas with little apparent cover.

POPULATIONS: Range has increased in Wisconsin as intensive cultivation has opened up new areas. General densities rather light with no drastic "ups" and "downs" as in other species. Best populations in southwestern Wisconsin.

FOOD: Many types of vegetation. Grasses and forbs in summer, shrub and tree bark in winter. Also waste grain.

VALUE: A very sporty animal to hunt because of speed, size and relatively low densities. Good eating. No real damage apparent in Wisconsin. Av. harvest: 17,000.

MANAGEMENT: Not much study has been devoted to this species, but it can be assumed that as long as clean farming continues, this species will remain with us in huntable numbers.

SNOWSHOE HARE

HABITAT: Brushy areas of conifer and canifer-hardwood stands, especially swamps with good growths of cedar and spruce and associated shrubs.

POPULATIONS: Marked variation in density from one year to next. Classed as a typically cyclic species. Areas "crowded" with snowshoes this year may have hardly any next year.

FOOD: Many kinds of plants during summer, as with other species of rabbits. Bark of trees and shrubs, and their twigs in winter.

VALUE: Important game animal in the north and usually good eating. Av. harvest: 100,000. In years of high density can kill many valuable timber species and compete with deer in deer yarding areas by killing browse species.

MANAGEMENT: Good timber management in conifer - hardwood areas aids rabbits by bringing in new shrub growth. Must be controlled by lenient seasons, trapping and poisoning in years when very abundant.

GRAY and FOX SQUIRREL

HABITAT: Gray: Hardwood and some types of hardwood-conifer forests. Farm woodlands preferably of large size and near other large wooded areas. Fox: Small areas of hardwoods within open farmlands. Along wooded streams and rivers.

POPULATIONS: Most years quite abundant. In winters with poor mast supplies, populations may decrease noticeably or may migrate considerable distances. Have increased generally as forests opened up by agriculture. Populations vary with success or failure of mast crops.

VALUE: Very important game animal. Sporty and has delicious meat. Av. harvest: 1,200,000. High sight value for all. Plants millions of oaks and hickories each year. Damages corn crops, some trees and fruits, digs up lawns.

MANAGEMENT: Maintenance of brushy woodlands (protect from fire and intensive grazing). Erecting nesting boxes in second-growth forests and winter feeding in poor mast years. Lenient seasons in years of abundance.

WOODCHUCK

HABITAT: Forested areas with heavy brush and many openings with grasses, etc. Farmlands with wooded areas, creek bottoms and brushy or rocky ravines and hillsides.
POPULATIONS: Relatively uncommon in pioneer times, but has increased with the opening of the large wooded tracts into farmlands.
FOOD: Many kinds of grasses and forbs; especially fond of clovers and alfalfa.

VALUE: Hunted more for sport than meat. A "target" animal. Very good sight value to most who see it. Damages crops if numerous, digs holes in pastures. Rabbits use its holes for escape.

MANAGEMENT: Good farming and forestry practices maintain its habitat. Now protected, since it is not overly common in south and since it is of great aid to cottontail rabbits.

Furbearers

The furbearing mammals, especially the beaver, were the great attraction to the very first explorers and trappers that entered Wisconsin. This early fur trade opened up the frontier much faster than it would have been opened by any other endeavor. In pioneer times, trappers took thousands of furs annually in Wisconsin and currently the modern trappers are doing the same thing. Muskrats and mink bring hundreds of thousands of dollars to the trappers in Wisconsin each year and the beaver still plays an important role, bringing in well over $100,000.

Trapping is as much a sport to many as is hunting, and is a part of the American tradition. It is also a necessary tool of good wildlife management, for it helps hold down populations that would otherwise increase to the point of self-extermination by starvation and disease. This would be a great waste and would be much more cruel to many more individual animals than trapping is.

Most good trappers are well aware of the possibility of animals escaping poor sets, and for many species they try to make sets that will drown or otherwise kill the animal quickly. They also tend their traplines regularly in the vast majority of cases and this lessens the time the animals that are yet alive have to remain in the traps.

Two furbearers once native to Wisconsin and then extirpated have been re-introduced into the state: the marten, introduced on Stockton Island in 1953 and the fisher, introduced into the Nicolet National Forest in 1956. At least the fisher seems to be holding its own and time will tell whether or not this animal will again be a permanent part of our fauna.

(Maps show general distribution and abundance: solid black = common; cross-hatching = fairly common; white = rare or none.)

MUSKRAT

HABITAT: Shallow water areas with dense aquatic plant growth; marshes, river and lake bays.
POPULATIONS: Very abundant in southern third and western part of state. Population varies drastically from very low in dry years with cold winters, to very high in wet years regardless of severity of winter.
FOOD: A great variety of aquatic plants, especially cattail and bulrush. On occasion frogs, turtles, clams, etc.
VALUE: Our most important furbearer. Av. harvest: 600,000. Pelt value varies from year to year. Sight value is good. Their opening of water patches in dense aquatic stands is beneficial to waterfowl.

MANAGEMENT: Preservation of wetlands, building of shallow flowages and level ditches in marshes. Need enough water to prevent "freeze-outs" in the winter. Intensive trapping pressure necessary when population is high to keep them from ruining their habitat.

BEAVER

HABITAT: Forested areas with abundant water sources, especially younger forest stands in early stages of succession.
POPULATIONS: Were numerous in pioneer times, but all but disappeared when forests were clear cut and burned. As second growth with its abundant aspen stands appeared, the beaver became more abundant than ever. As forests again reach old age the beaver will decrease.
FOOD: Summer, almost any plant or its roots, stems and bark. Winter, bark of trees and shrubs which it stores in food piles, especially aspen, willow and cottonwood.

VALUE: A very important, large furbearer. Av. harvest: 11,000. Its ponds are important producers of other aquatic wildlife. In certain areas the ponds are detrimental to trout streams, drown timber, soften road beds, etc.

MANAGEMENT: Range currently excellent. Future will need forestry management to keep second growth in young succession stages. Lenient seasons required annually to hold population within bounds.

RACCOON

HABITAT: Forested and semi-open country with abundant water sources and wet marshes.

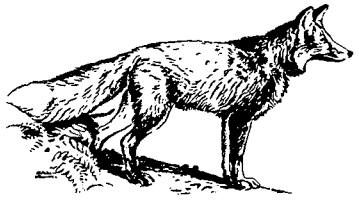
POPULATION: More southern in state in pioneer times. With advent of farming, they moved north and are now very abundant over much of the state.

FOOD: Great variety including fruit, nuts, insects, frogs, crayfish, bird eggs, grains, etc.

VALUE: Very good sport animal; delicious meat when properly prepared. Pelt value relatively low. Av. harvest: 20,000. Damage corn and other grain crops, occasionally kill poultry and destroy eggs of nesting birds, especially wild ducks. Break into cottages and destroy property.

MANAGEMENT: Maintenance of timber in water areas and curtailing of grazing in woodlands will preserve their habitat. Preservation of den trees important. Could be hunted more in much of their range.

RED FOX



HABITAT: Hilly country with woods, fields, marshes, etc., preferred, but found in dense forests or very open farmlands.

POPULATIONS: Fluctuate up and down. During past twenty years, they have increased markedly and held level. Will remain with us in relatively high numbers unless hunting them becomes more popular. Opening of northern forests has increased red fox there.

FOOD: Primarily small mammals, with rodents most important. Eats birds, insects, fruits and berries in season. Some destruction of game animals is off-set by its value in controlling small rodents.

VALUE: Sport animal enjoyed by many hunters. Hide value variable, but in recent years very low. Sight value high. Av. harvest: 23,000. Helps control rodent populations. Destroys game animals and poultry.

MANAGEMENT: No habitat management necessary. Control necessary in some areas where do damage to poultry or game. Bounties have been paid for this animal, but they have not controlled red fox population. This money could be better spent to improve game habitat. Hunting and trapping them for sport if greatly increased would help hold population down.

GRAY FOX

HABITAT: Brushy forests and bluff country with wild brushy ravines and slopes.

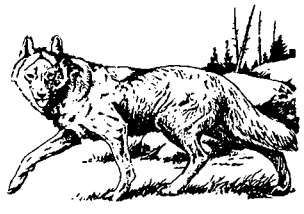
POPULATIONS: Fluctuate up and down but in general much less common than the red fox. Probably spread in the state too, due to farming and creation of brushy areas that were once mature woods.

FOOD: Same animals as red fox, but a more decided preference for vegetable matter.

VALUE: Sport animal hunted by many. Hide value low. Sight value high. A very pretty fox. Av. harvest: 4,700. Due to smaller population, not as important in the plus and minus values given for the red fox.

MANAGEMENT: Same as for red fox.

TIMBER WOLF



HABITAT: Heavily forested wilderness areas.

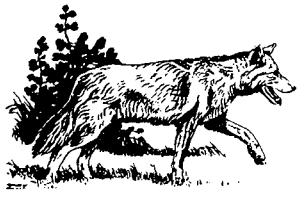
POPULATIONS: During pioneer days it was a common animal over much of the state. With break-up of large forested areas and intensive trapping and hunting, has been reduced to near extinction.

FOOD: Mammals, birds, fish, fruit, insects. Mostly small animals, but will take large animals, even deer when opportunity presents itself. In winter, it often hunts for food in packs.

VALUE: Once a hunting and trapping trophy. Now value lies only in its majestic appearance. Its lonely howl has tremendous aesthetic appeal, to the few who have heard it. If abundant, would no doubt prey more on deer.

MANAGEMENT: Now protected to try and maintain the remnant population. Without doubt doomed to extinction in Wisconsin. Preservation of large wilderness areas best habitat management.

COYOTE



HABITAT: Semi-open country with much brush and forested country if not too extensive and mature.

POPULATIONS: In early days this animal restricted to southern Wisconsin, but with opening of northern forests by farming and logging, it moved north. Now healthy populations in central and northern Wisconsin.

FOOD: Small mammals and birds plus many other animals and fruits and berries. Will eat carrion. Preys upon domestic animals.

VALUE: Sport animal of considerable importance to many trappers and hunters. Hide of little value currently. Av. harvest: 2,000. Sight and sound value high to those who know this animal. Damage to livestock less important in Wisconsin than in the west, but does kill sheep, pigs and poultry on occasion.

MANAGEMENT: Control of population in areas of intensive agriculture to reduce livestock damage. No habitat management necessary.

BOBCAT

HABITAT: Forested areas with much brush, prefers broken country with many large conifer swamps.

POPULATIONS: Once common over most of state, now uncommon except for certain areas.

FOOD: Small mammals and birds primarily. Preys heavily on snowshoe hares. Will kill deer rarely, especially if deer is wounded.

VALUE: Very sporting animal to hunt with hounds. Some are trapped for fur and sport. Hide value now quite low. Sight and sound value high. Not abundant enough to cause serious livestock damage. Av. harvest: 500.

MANAGEMENT: No special habitat management necessary and animals are holding their own. If drastic decrease due to hunting and trapping, it will need protection. Many paper companies would like to see it protected, since it preys on the destructive snowshoe hare.

CANADA LYNX

HABITAT: Large mature forest areas, with swamps.

POPULATIONS: Once occurred over most of the state in relatively good numbers. Now, due to disappearance of large forested tracts, almost extinct; few killed in last 15 years. May increase a bit with return of larger forests due to succession and forest protection.

FOOD: Mostly small mammals and birds with other small animals. Prefers to prey upon the snowshoe hare and follows its fluctuating populations in relative densities. Can and does kill deer on occasion.

VALUE: Not abundant enough for sport or fur animal currently. Sight value would be high if seen, but very secretive compared to bobcat. Too rare to do damage to livestock.

MANAGEMENT: Protection of the few wilderness areas left in Wisconsin and protection of the few remaining individuals. Latter difficult, since lynx is very similar to bobcat to the average person.

SKUNK

HABITAT: Semi-open country with many fields, brush patches and marsh. Occasionally in heavy forests or wide open country.

POPULATIONS: Generally common are the striped skunks; the spotted skunk is rare. Have increased with the opening of the large forest areas. Populations vary from year to year depending upon disease and severity of winters.

FOOD: Insects and their grubs, mice, eggs, berries and fruits, and many other small animals. Often will kill poultry.

VALUE: Fur of little value currently. Once trapped quite extensively. Very beneficial in its destruction of insects and mouse nestlings. Harmful to poultry and a prime carrier of rabies in Wisconsin.

MANAGEMENT: No habitat management necessary. Control of high densities desirable to check spread of robies.

BADGER

HABITAT: Open grasslands preferred, but found well into forested areas if there are ample openings with grasses.

POPULATIONS: In frontier days, was probably only found in western and southwestern Wisconsin, but with opening of forest lands, it extended its range eastward and northward. Not overly common anywhere in Wisconsin and very secretive, therefore, seldom seen.

FOOD: Primarily small rodents which it digs out of burrows. Also larger insects, etc.

VALUE: Fur currently very low in value. Not abundant enough or easy enough to hunt or trap for much sport value. Av. harvest was 300 per year. Helps control harmful rodents, but large burrows and piles of earth harm pastures.

MANAGEMENT: No habitat management necessary. Complete protection now given this animal.

WEASEL

HABITAT: New York weasel and ermine mostly in forest lands with brush and brushy marshes and swamps. Least weasel prefers open country.

POPULATIONS: Variable through the years, but usually quite common. Least weasel rather rare.

FOOD: Primarily small mammals, especially rodents, but will take birds or any other animal it can overpower. Often raids poultry houses.

VALUE: Pelts of New York weasel and ermine (short-tailed weasel) once relatively valuable. Least weasel too small to pelt. Currently pelts of low value. Sight value good. Do much good in helping control harmful rodents. Do considerable harm to poultry raisers in many instances.

MANAGEMENT: None necessary, since habitat is good. Control of individuals in poultry houses necessary. Some trappers still trap them hard enough in some areas to reduce them a bit.

MINK

HABITAT: Along all wooded shorelines and in brushy, wet marshes and swamps, seldom far from water.

POPULATIONS: Was always quite common over much of state, since we have so much woodland and water. Decreasing in many areas due to wetland drainage.

FOOD: Primarily small mammals, but eats birds and their eggs, frogs, crayfish, minnows and large insects. Preys upon muskrats.

VALUE: A very important furbearer whose pelt value has remained relatively high while other pelts have dropped drastically in value. Trapped annually. Av. harvest: 30,000. Help control rodents, but do occasional damage to poultry raisers and muskrat farmers.

MANAGEMENT: Preservation of wetlands is necessary to maintain mink habitat. Annual seasons to prevent population build-up, as even these animals are susceptible to disease outbreaks.

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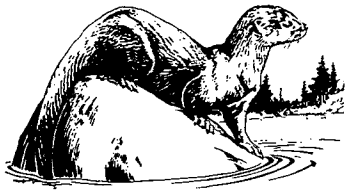


HABITAT: Forested areas with creeks, rivers, lakes and ponds. Best in wilderness areas.

POPULATIONS: Never common in Wisconsin, but holding their own and even increasing in many areas in spite of being trapped annually.

FOOD: Primarily fish, with rough fish and panfish most commonly eaten. Frogs, crayfish, large aquatic insects, clams, turtles and small mammals on occasion.

VALUE: A valuable furbearer sought after by trappers because its pelt value remains relatively high. The most durable fur; used for trim. Av. harvest: 600. Sight value high, but not commonly seen. In its destruction of rough fish and panfish, it does much more good than harm to fish populations.

MANAGEMENT: Preservation of forests, especially large wilderness areas that have abundant supplies of water, will ensure its welfare. Annual trapping seasons do it no harm, since it is never an overly common animal even with full protection.

OPOSSUM

HABITAT: Wooded areas with interspersion of open farmlands and creeks, rivers, lakes, marshes and swamps.

POPULATIONS: Rare in pioneer times, but with opening of forest areas, has moved into southern third of Wisconsin. Series of mild winters helps build population to high numbers, but one very severe winter can drastically reduce population.

FOOD: Almost anything edible, including carrion. Fond of fruits, berries, earthworms, large insects, bird eggs, garbage, etc.

VALUE: Pelt value very low. Not an important sport animal, but could be hunted more with coon hunting technique. Good eating if prepared right. Does damage to eggs and poultry in hen houses. Is beneficial in that it helps clean up dead animals many having died from disease that could spread to other game.

MANAGEMENT: Not protected and habitat needs no improvement. High populations may need control, but this is difficult.

Non-Game Mammals

The non-game mammals are generally the smaller species that are not sought for their sporting qualities, meat or pelts. Many of them such as the insect-eating bats and the shrews are very beneficial while others such as many species of mice are decidedly destructive to farm crops and properties.

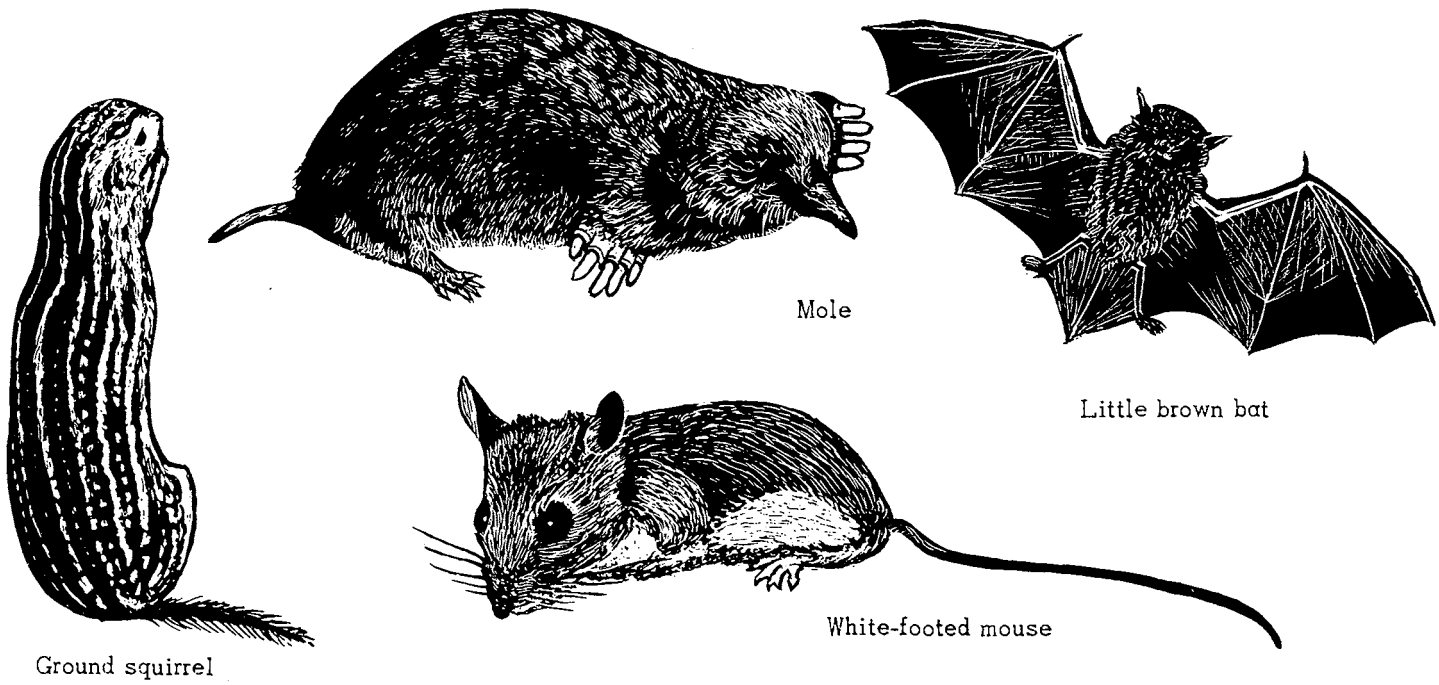
Some are quite interesting in their habits and very pretty in appearance. The world of nature would be much less interesting if it were not for these little creatures!

Many millions of these small mammals are eaten by other more important animals in Wisconsin each year and indeed form the basic food for many of the larger species. Since many larger animals are typical predators, they would prey much more on our important game species if it were not for the abundance of these smaller mammals. They absorb the "shock" of the predators and are therefore called "buffer" species.

Group	Habitat	Range and Season	Food and Importance Rating
PORCUPINES (1 kind; Canada porcupine)	Forested areas.	Northern half of state. Active all year.	Bark of many kinds of trees, and other plants. Also meat. Destructive to trees in areas where abundant.
BATS (7 kinds; big brown bat typical)	Forested areas with openings preferred. Often fly over open water areas.	Most species state-wide. Fly during warm months. Some species migrate, others hibernate.	Primarily flying insects of which they take so many millions that they can only be rated as very beneficial.

Group	Habitat	Range and Season	Food and Importance Rating
CHIPMUNKS (3 kinds; gray chipmunk typical)	Forested areas.	One state-wide. Two others restricted. Active during warm months and hibernate during winter.	Seeds, nuts, fruits, vegetation, insects, bird eggs, etc. Usually neutral, but individuals are destructive in cabins, etc.
GROUND SQUIRRELS (2 kinds; 13-lined ground squirrel typical)	Open country and semi-open brushlands.	One state-wide and one restricted. Active during warm months, hibernate during winter.	Vegetable matter of all kinds, insects, bird eggs, baby birds, grain. Most neutral, but often destroy sprouting corn and oats.
FLYING SQUIRRELS (2 kinds; northern flying squirrel typical)	Forested areas.	One kind in southern and one kind in northern Wisconsin. Active all year.	Fruits, seeds, buds, berries, nuts, insects, bird eggs and young birds. Neutral, except pests when enter attics.
RED SQUIRRELS (2 kinds; southern red squirrel typical)	Prefer coniferous forests, but found in hardwood-conifer stands also.	One, northern 3/5 of state. Other, northwestern Wisconsin. Active all year.	Nuts, pine seeds, buds, vegetation, bird eggs, young birds, mushrooms, tree sap, etc. Neutral.
MOLES AND SHREWS (2 kinds of moles; 9 kinds of shrews; prairie mole and cinereous shrew typical)	Most habitat types inhabited by one or more kinds.	One state-wide, others restricted. Active all year.	Primarily insects; earthworms, small animals; mice on occasion; some vegetable matter. All very beneficial.
VOLES AND MICE (2 kinds of voles; 10 kinds of native mice, meadow vole and deer mouse typical)	Most habitat types inhabited by one or more kinds.	Two state-wide and rest restricted. All but jumping mice active all year.	Seeds, nuts, vegetation, bark, insects, grains, etc. Many very destructive and others neutral.
POCKET GOPHERS (Shaw's Pocket Gopher)	Open country.	Western Wisconsin. Active all year.	Roots, tubers and bulbs of plants. Often destructive in gardens, croplands and pastures.

(The common house mouse and the Norway rat are not native mammals; they are introduced, or exotic species, and are well known for their destructiveness, filthy habits and general abundance about homes, farms and dumps. Both are state-wide in distribution and are two mammals we could well do without!)



Mole

Little brown bat

White-footed mouse

Ground squirrel

BIRDS

It is a rare bird indeed that is not beautiful when observed at close range! Birds are to be valued as creatures of beauty and many have pretty songs and the arrival of some of these songsters in early spring heartens many a winter-weary person.

Some 336 species of birds can be found in Wisconsin. Most of them are quite common, a smaller number are rare and yet a smaller number are only occasional visitors. Much remains to be found out about our Wisconsin birds, since vast areas of the state have not been intensively observed by ornithologists. New species will undoubtedly be found in the future and the ranges of others extended.

Birds are wonderfully adapted for flight, with hollow bones and features. They are very active and have high blood temperatures. This naturally requires much food daily and there are many birds that will eat almost their body weight in food each day. Some individuals may eat up 3,000 small insects a day! There are, in fact, few species of birds that do not feed on insects at least part of the time. Add to this the birds that eat weed seeds and those such as the hawks and owls that eat millions of rodents each year in Wisconsin alone and you can see the immense value of these interesting animals.

Each species of bird, like every other animal or plant has a certain habitat preference, some tolerating wide variations in habitat and others being unable to tolerate even rather small changes. Studying birds will soon awaken real desire to understand more about each bird and its relationship to all parts of its environment.

In the following pages the upland game birds and the migratory game birds are listed in separate sections. These birds bring sport to many hunters and when properly prepared are delicious eating. Since most birds have a very high natural mortality and live only a relatively short period of time, it is only good management to harvest them, for hunting gives one much needed exercise, mental release from tensions and some good eating. Songbirds, miscellaneous water birds, marsh and shore birds and birds of prey are grouped and treated in a little less detail since there are so many species involved.

Upland Game Birds

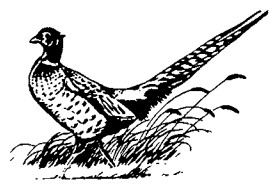
There are eight kinds of upland game birds in Wisconsin which live in the state year around: ruffed grouse, bobwhite quail, sharp-tailed grouse, ring-necked pheasant and Hungarian partridge are hunted; prairie chickens, spruce grouse and wild turkey are now protected. Willow ptarmigan was once recorded for the state.

Pheasants (introduced from Europe) and ruffed grouse are the two most important upland game birds, hundreds of thousands each being shot annually in Wisconsin. Hungarian partridge (also introduced from Europe) are important game birds in southeastern and eastern Wisconsin, while bobwhites are found mostly in the southwestern and western parts of the state.

Prairie chickens and sharp-tailed grouse reached outstanding numbers in the days following the cutting and burning of the large timber, for the open country increased the range and numbers of both birds. Now that forest areas are growing into heavy timber again, these two species are in danger and there has been no hunting or only limited hunting of them in recent years.

(Maps show general distribution and abundance: solid black = common; cross-hatching = fairly common; white = rare or none.)

RING-NECKED PHEASANT



HABITAT: Farmlands with marshes and other undisturbed grassy areas for nesting.

POPULATIONS: Introduced from Europe in 1916. Highest populations in early 1940's. 800,000 shot in 1942. Population fluctuates annually, depending on nesting weather, and severity of winters.

FOOD: Insects, seeds, grain, vegetation.

VALUE: Very important game bird. Good eating. Av. harvest: 480,000. Damage some crops locally but eat large numbers of grasshoppers and other insects.

MANAGEMENT: Good land use, and saving wetlands. Creation of undisturbed nesting cover. Crop cocks heavily. Game farm releases 200,000 annually.

BOBWHITE QUAIL

HABITAT: Farmlands interspersed with many brushy areas, hedgerows and grassy marshes.

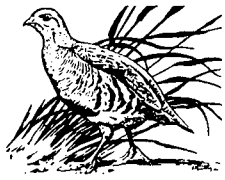
POPULATIONS: A more southern bird that has moved north in Wisconsin following deforestation and cultivation. Clean farming ruins habitat. Severe winters seriously reduce quail populations.

FOOD: Insects, seeds, grain, berries, and tender vegetation.

VALUE: Important game bird. Sight and spring song value. Av. harvest: 20,000.

MANAGEMENT: Establishment of "odd corners" of brush; preservation or restoration of existing brushy hedgerows through selective brush management on rights-of-way. Prevention of wetland drainage and supplying of natural winter foods.

HUNGARIAN PARTRIDGE



HABITAT: Intensively cultivated open farmlands.

POPULATIONS: Introduced from Europe in 1908. Populotion was ot peok in early 1930's. Now harvest 40,000 to 50,000 annually. Apparently some winter movement within the state.

FOOD: Insects, seeds, grain, vegetation.

VALUE: Important game bird. It is the only common uplond gome bird in certain areas. Destroys mony insects.

MANAGEMENT: Intensive forming with good soil practices to insure good hay and grain crops. Should try and shoot more birds in years of abundance.

RUFFED GROUSE

HABITAT: Young forests, or mature forests that are thinned and have much brush. Forest edges. Alder runs along creeks in aspen, birch, maple, oak country. Mixed stands with brush.

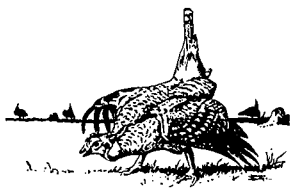
POPULATIONS: Probably scarce in pioneer times with mature timber stands. Logging and settling with breakup of forests and creation of second-growth timber brought very high populations. Will decrease as forests mature.

FOOD: Insects, berries, seeds, nuts, buds, leaves, tender vegetation.

VALUE: Very important game bird. Sight value and good sport qualities. Av. harvest: 690,000.

MANAGEMENT: Intensive logging to create brushy, younger woodlands, ond light grazing of woodlands. Should harvest these birds every year as the turnover rate is substantial.

SHARP-TAILED GROUSE



HABITAT: Earliest stages of forest succession with its openings and scattered thickets (halfway between prairie chicken and ruffed grouse habitat types).

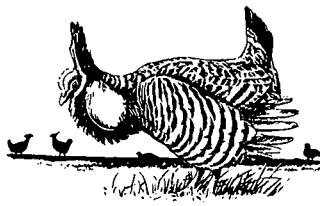
POPULATIONS: After logging of the early settlement period the open land came into brush and second growth forest and much sharptoil "edge" was created. The birds responded and became numerous. Maturing forests are threatening this species.

FOOD: Seeds, berries, insects, buds, leaves and tender vegetation.

VALUE: Was once a game bird of high value. Now since it is so reduced in numbers, it is hunted mainly as trophy bird. It would be worth bringing back in areas where this is possible. Av. harvest: 6,500.

MANAGEMENT: By logging and burning to keep forests in youngest stage of succession with many openings and thicket edges and preserving the few open areas that remain in its range, this species can be maintained. Intensive efforts necessary to bring it back to high density.

PRAIRIE CHICKEN



HABITAT: Large expanses of open grasslands with timber. Grassland-wet marsh areas good.

POPULATIONS: Historicolly were birds of southern Wisconsin. Cultivation drove them north into the deforested, open slash areas. Flourished here until forests and intensive land use of today ore threatening to obliterate them.

FOOD: Seeds, berries, insects, grain, buds, leaves and tender vegetation.

VALUE: Of little sport value currently compared with high value of a few decades ago. High sight value on courtship grounds. Like the sharptail, it would be well worth while if we could increase its numbers.

MANAGEMENT: Maintenance of open country (grassland with undisturbed nesting cover and rearing cover). Planting of scattered food patches.

Protected Upland Game Birds

CANADIAN SPRUCE GROUSE

This grouse is a resident in the northern third of Wisconsin where it is found in the areas with large conifer swamps. It is not common and is distributed rather spottily within its range. It feeds on seeds, buds, insects, etc. As the forests mature, it may become abundant enough to be an important game species.

WILLOW PTARMIGAN

This is a bird of the far north and there are very old records of it being in far northern Wisconsin. Recent years have not shown the bird to be present.

WILD TURKEY

Once common in many parts of southern Wisconsin it became exterminated. A recent release of turkeys in the west central part of Wisconsin has been successful in that broods are produced each yeor by these birds. It is hoped that they at least maintain themselves, even if they never become abundant enough to hunt. They feed on a variety of seeds, nuts, vegetation and some buds.

Waterfowl

Waterfowl migrate varying distances — many breed in Canada, travel through the United States, and winter in the Gulf states, Mexico and points south. Migratory game birds thus become an international problem and hunting regulations must be agreed upon by all countries concerned.

Much effort has been expended in reclaiming nesting grounds in Canada and intensive studies are being undertaken in the Canadian breeding areas to determine just exactly what each duck species needs as far as good quality habitat is concerned.

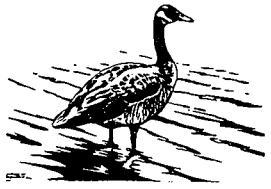
An effort is being made in Wisconsin to preserve the remaining wetlands and everyone should give this program full support. Artificial flowages have been created on many areas to help migrating and nesting waterfowl. The thousands of beaver ponds that exist in Wisconsin produce many ducks and give feeding and resting areas to many thousands of them during spring and fall migrations.

Seasons and bag limits are carefully planned for sustained annual crops of migratory game birds. The sporting values of waterfowl are tremendous and the majority of them make fine food. The sight value of large flocks of waterfowl or single individuals with their bright colors is even more striking.

There are 42 kinds of waterfowl and 6 kinds of shorebirds that are hunted in Wisconsin. These shorebirds are included here with waterfowl since they are migratory game birds.

(Maps show main concentration areas in spring and fall: solid black = common; cross-hatching = fairly common; white = rare or none.)

GEESE



KINDS: 8 kinds (3 in snow goose genus; 1 in white-fronted goose genus; 4 in Canada goose genus). Canada goose most abundant and a leading game species.

HABITAT: Lakes, rivers, large marshes, grain fields and grassy fields of large area.

SEASON: Spring and fall migrations. A few Canada geese nest in Wisconsin.

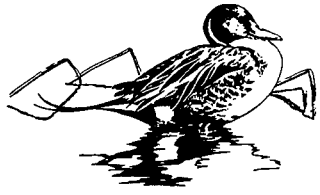
POPULATIONS: Canada geese have increased while others have decreased. Intensive farming has helped them during migration while preservation of breeding grounds in Canada has done most for them.

FOOD: Large insects, seeds, grains, grasses and sedges.

VALUE: Important game species with the Canada the leader. Exceptional "sight" value, especially in spring. Excellent table qualities. Av. harvest: 20,000.

MANAGEMENT: Establishment of refuges for rest and feeding during migration; protection during hunting season. Refuges spread population over a larger area to reduce crop damage. Nesting grounds in Canada must be preserved. Preservation of wetlands.

DABBLING DUCKS



KINDS: 13 kinds (3 in mallard genus; 1 gadwall; 2 in baldpate genus; 3 types teal; 1 shoveller; 2 in pintail genus; 1 wood duck). 4 very rare.

HABITAT: Marshes, potholes, lakes, rivers and creeks. Mallard group commonly uses farm fields for feeding. All love shallow, weed-choked waters.

SEASON: Most abundant in spring and fall migration. A number of species nest in Wisconsin.

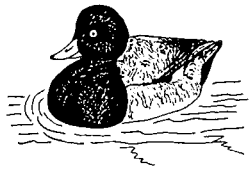
POPULATIONS: Diving ducks once outnumbered dabbling ducks; now reduced because of drought in breeding range. Dabblers have been less affected. In drought period of 1930's all ducks were drastically reduced. By establishment of large nesting areas and restricted hunting they increased but in early 1960's hard hit again by drought.

FOOD: Seeds, aquatic vegetation, insects, grain, grasses and sedges.

VALUE: All dabblers combined are very important game birds; sight value of dabblers is great; av. harvest: 630,000 (dabblers and divers). All are very good eating. The mallard is the leading waterfowl species shot in Wisconsin. Some crop damage by mallards particularly.

MANAGEMENT: Preservation of wetlands for their breeding and rearing grounds. Restricted seasons in drought years. Establishment of refuges with good food and resting areas along flyways.

DIVING DUCKS



KINDS: 20 kinds (3 merganser types; 5 in scaup genus; 2 in goldeneye genus; 1 bufflehead; 1 old squaw; 1 harlequin; 1 ruddy; 1 masked; 2 in eider genus; 3 in scoter genus).

HABITAT: Most prefer larger lakes and rivers. A few species prefer small lakes, ponds and sloughs. Rarely come to land.

SEASON: Most abundant in spring and fall migrations. A few species nest in Wisconsin.

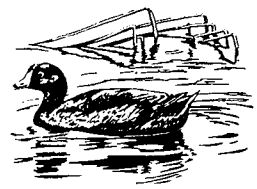
POPULATIONS: Carp, siltation and pollution have destroyed much of the weed bed areas in their favorite lakes and rivers. Drainage of wetlands and ponds has affected them too. Numbers now are less than we'd like to see. Drought seriously affects many species on their nesting grounds.

FOOD: Aquatic plants, insects, crayfish, small fish, molluscs, grasses, sedges.

VALUE: All divers combined are very important game birds. Sight values are great. Most of them are good eating while the canvasback is unsurpassed. Neutral.

MANAGEMENT: Preservation of wetland areas for breeding, stoppage of siltation and pollution, and restricted season during drought periods. For certain species saving a few of the larger lakes that they traditionally use in migration would help.

COOTS



KINDS: 1 kind.

HABITAT: Marshes, lakes, river bays and quiet sloughs.

SEASON: Largest numbers during migration, but many nest in Wisconsin especially in areas of big marshes with ponds.

POPULATIONS: Fairly stable population of coots until recent years when they have decreased noticeably.

FOOD: Aquatic insects, other invertebrotes, grasshoppers and other shoreline insects, grasses and tender aquatic plants.

VALUE: An important game species; av. harvest: 170,000. Limited "sight" value, but real "comics" to watch. Neutral.

MANAGEMENT: Wetland preservation is the best management tool for this species. If habitat is right there will be plenty of coots to hunt.

Marsh and Shore Birds

This very general group is composed of birds found near water, commonly on shorelines or in the marsh vegetation not far from water. Some of the shorebirds have been listed under migratory game birds but the ones that are protected will be listed here.

These birds are well adapted to their particular environments, some wading birds having exceptionally long legs for stalking in deeper water, while other wading birds have relatively short legs for running in the shallows. Many have very long bills for probing into the wet earth for food.

Gulls, terns and jaegers are included here for they are most common just off shore where they hunt their food on the wing.

Game Species (Hunted)

WOODCOCK

SHOREBIRDS THAT ARE HUNTED: 6 kinds (3 in rail genus; 1 Gallinule; 1 woodcock; 1 Wilson's snipe).

HABITAT: Wet shorelines and weedy margins of lakes, creeks, ponds, potholes and marshes. Woodcock often in damp woods.

SEASON: Most in spring and fall migration periods. All species nest in Wisconsin.

POPULATIONS: Florida Gallinule and king rail uncommon; other four shorebirds very common but slowly losing ground as wetlands are drained.

FOOD: Insects, earthworms, aquatic plants, etc.

VALUE: Important game birds. Woodcock the most important species; av. harvest: 22,000. "Sight" value high. Neutral.

MANAGEMENT: Preservation of wetlands for these birds is the most important management practice. The jacksnipe, a relative, is also a game species but open seasons are only allowed occasionally.

Non-Game Species (Protected)

Group	Habitat	Range and Season	Food and Value
HERONS AND BITTERNS 10 kinds (a few very rare) Great Blue Heron typical.	Marshy areas, in marsh growth along lakes, rivers and creeks.	Some restricted, some state-wide. Summer residents and visitors. Some locally in winter.	Frogs, salamanders, fish, reptiles, large aquatic insects. Neutral.
SPOONBILLS AND IBISES 3 kinds (2 very rare, 1 old records).	Marshy areas and grassy shorelines.	Southern Wisconsin. Rare late summer visitors.	Aquatic insects, tadpoles, aquatic invertebrates, very small animals. Neutral.
PLOVERS AND SANDPIPERS 39 kinds (some very rare, 1 thought to be extinct). Pectoral Sandpiper typical.	Muddy and sandy shorelines usually. Open fields and meadows.	Some state-wide, some restricted. Summer residents and visitors.	Aquatic invertebrates of all kinds. Beneficial.
CRANES 3 kinds (1 common, 2 very rare, old records). Sandhill Crane typical.	Large open marshy areas with heavy marsh grass and thickets.	All restricted. Summer residents and visitors.	Roots, bulbs, grain, corn. Aquatic invertebrates, frogs, small reptiles, etc. Neutral.

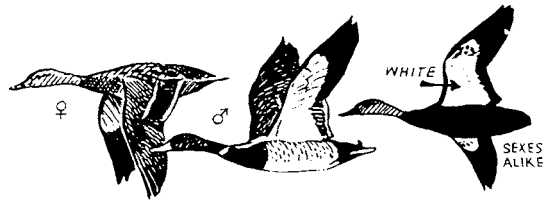
Know Your Ducks

FIELD GUIDE FOR HUNTERS

Look for distinctive shapes, colors, and action. Consider habitat and time of year.

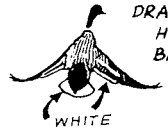
In summer, drakes moult into 'eclipse' plumage and resemble hens. A few drakes, notably teal, remain in eclipse all fall. Immature drakes also look like hens.

UNITED STATES DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE



MALLARD

HEN : BROWN.
DRAKE : GREEN HEAD, BROWN BREAST, GRAY BODY, BLACK RUMP.



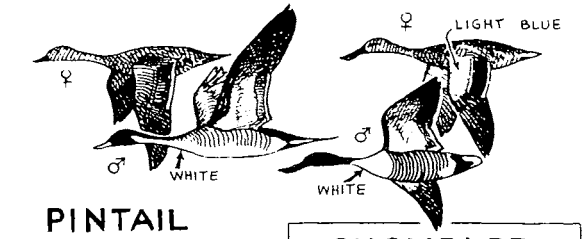
DRAKE IS THE ONLY DUCK WITH A NARROW WHITE NECK RING.

BLACK DUCK

BROWN HEAD, BLACK BODY.

WHITE UNDERWING VERY CONSPICUOUS IN FLIGHT.

♀ : HEN
♂ : DRAKE

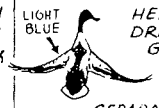


PINTAIL

HEN : BROWN.
DRAKE : BROWN HEAD, GRAY BODY, BLACK RUMP.

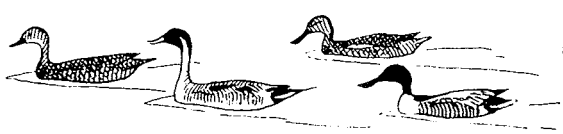
WHITE BELLY OF DRAKE AND SLENDER SILHOUETTE OF BOTH SEXES ARE GOOD FIELD MARKS

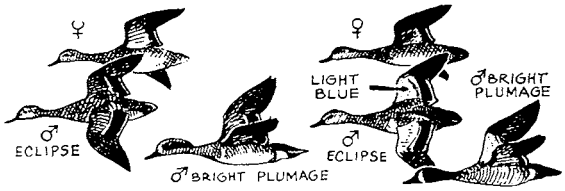
SHOVELER



HEN : BROWN.
DRAKE : DARK GREEN HEAD, BROWN BELLY AND FLANKS, SEPARATED BY WHITE.

THE SHOVEL BILL IS VERY PROMINENT.





GREEN-WINGED TEAL

HEN : BROWN.
DRAKE IN ECLIPSE: BROWN.

DRAKE IN BRIGHT PLUMAGE : GREEN AND RED HEAD, GRAY BODY.

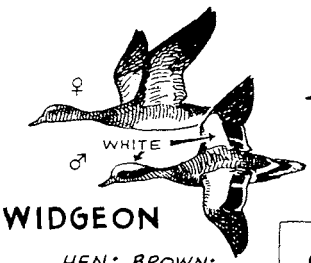
OUR SMALLEST DUCK. FLIGHT IS USUALLY SWIFT AND ERRATIC.

BLUE-WINGED TEAL

HEN : BROWN.
DRAKE IN ECLIPSE : BROWN.

DRAKE IN BRIGHT PLUMAGE : BLACK AND WHITE HEAD, GRAY-BROWN BODY.

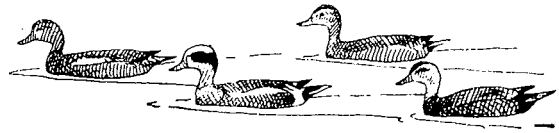
A SMALL DUCK. FLIES LIKE GREEN-WINGED TEAL.

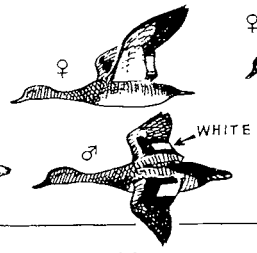


WIDGEON

HEN : BROWN; GRAY HEAD.
DRAKE : BROWN; GRAY HEAD, WHITE CROWN.

THE WHITE FOREWING OF BOTH SEXES IS EASY TO SEE AT A DISTANCE.

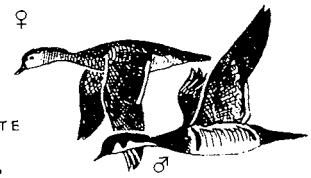




GADWALL

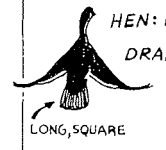
HEN : BROWN.
DRAKE : GRAY BODY, BLACK RUMP, WHITE BODY.

THE WHITE SPECULUM SHOWS ON BOTH DRAKE AND HEN.

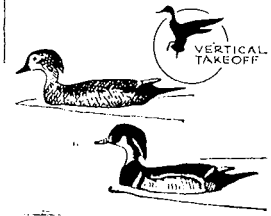


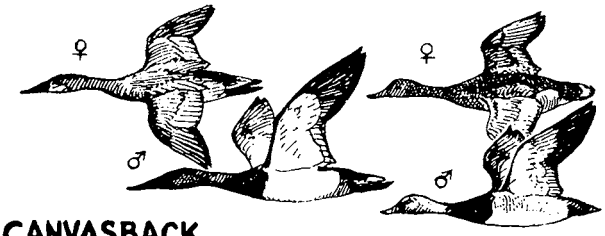
WOOD DUCK

HEN : DARK BROWN.
DRAKE : VERY DARK BACK, WHITE BELLY.



FLYING BIRDS USUALLY POINT THEIR BILLS DOWN, AND OFTEN TWIST THEIR HEADS FROM SIDE TO SIDE





CANVASBACK

HEN : GRAYISH
DRAKE : RED HEAD, BLACK BREAST AND RUMP, WHITE BODY.

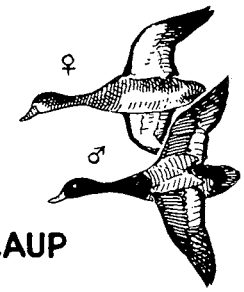
POWERFUL, FAST FLIER, IN V-FLOCKS OR WAVY LINES. THE SLOPING PROFILE IS DISTINCTIVE.

REDHEAD

HEN : BROWN; GRAY WINGS
DRAKE : RED HEAD, BLACK BREAST AND RUMP, GRAY BODY.

OFTEN TRAVELS WITH "CANS," BUT IS GRAYER, HAS BLUISH BILL.

RUNNING TAKEOFF



SCAUP

HEN : BROWN
DRAKE : "BLACK ON EACH END - WHITE IN THE MIDDLE."

ALSO CALLED "BLUE-BILLS" OR "BROADBILLS." SWIFT AND ERRATIC FLIERS.

RUNNING TAKEOFF

RINGNECK

HEN : BROWN; GRAY WINGS.
DRAKE : BLACK, GRAY & WHITE.

BILLS HAVE RINGS AT TIP AND BASE

"BLACKJACKS" TRAVEL IN GROUPS OF 6-12, FLY SWIFTLY, ALIGHT WITHOUT CIRCLING.

♀ : HEN
♂ : DRAKE

GOLDENEYE

HEN : BROWN HEAD; GRAY BODY.
DRAKE : BLACK AND WHITE

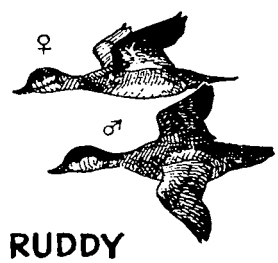
WINGS "WHISTLE" IN FLIGHT, A SOUND AUDIBLE FOR SOME DISTANCE.

BUFFLEHEAD

HEN : DARK GRAY AND WHITE.
DRAKE : BLACK AND WHITE.

ONE OF OUR SMALLEST DUCKS. USUALLY IN VERY SMALL FLOCKS.

RUNNING TAKEOFF



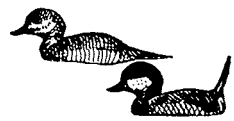
RUDDY

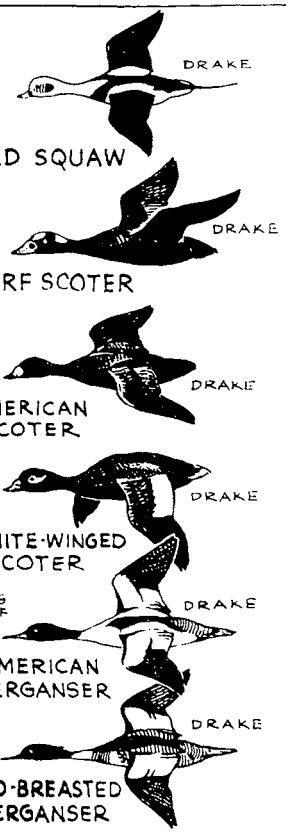
HEN : GRAY
DRAKE : GRAY; WHITE CHEEKS.

BILLS ARE BLUISH.

WILL OFTEN DIVE RATHER THAN FLY. LIGHT CHEEK PATCH IS A TELLTALE MARK.

RUNNING TAKEOFF





Group	Habitat	Range and Season	Food and Value
RAILS AND GALLINULES 2 kinds (1 very rare). 4 more common kinds listed under "Game Species."	Weedy shorelines and marshy areas.	Restricted. Summer residents and visitors.	Small invertebrates, aquatic plants, etc. Neutral.
GULLS, TERNS AND JAEGERS 3 kinds Jaegers (all very rare). 16 kinds of Gulls and Terns (many very rare). Herring Gull typical.	Shores of larger lakes and rivers. Usually flying off shore.	Many are seasonal visitors. A few summer and winter residents. A few state-wide.	Fish, dead and live aquatic animals and insects. Beneficial.
PELICANS 2 kinds (1 very rare).	Larger lakes and rivers.	1 during migration, 1 very rare summer visitor.	Fish primarily.
MAN-O-WAR BIRDS Man-O-War Bird recorded once in Wisconsin.			

Miscellaneous Water Birds

A few typically water-loving birds are found in Wisconsin that are migratory but not game birds. They are given protection from hunting since they are not overly abundant and most are not good eating.

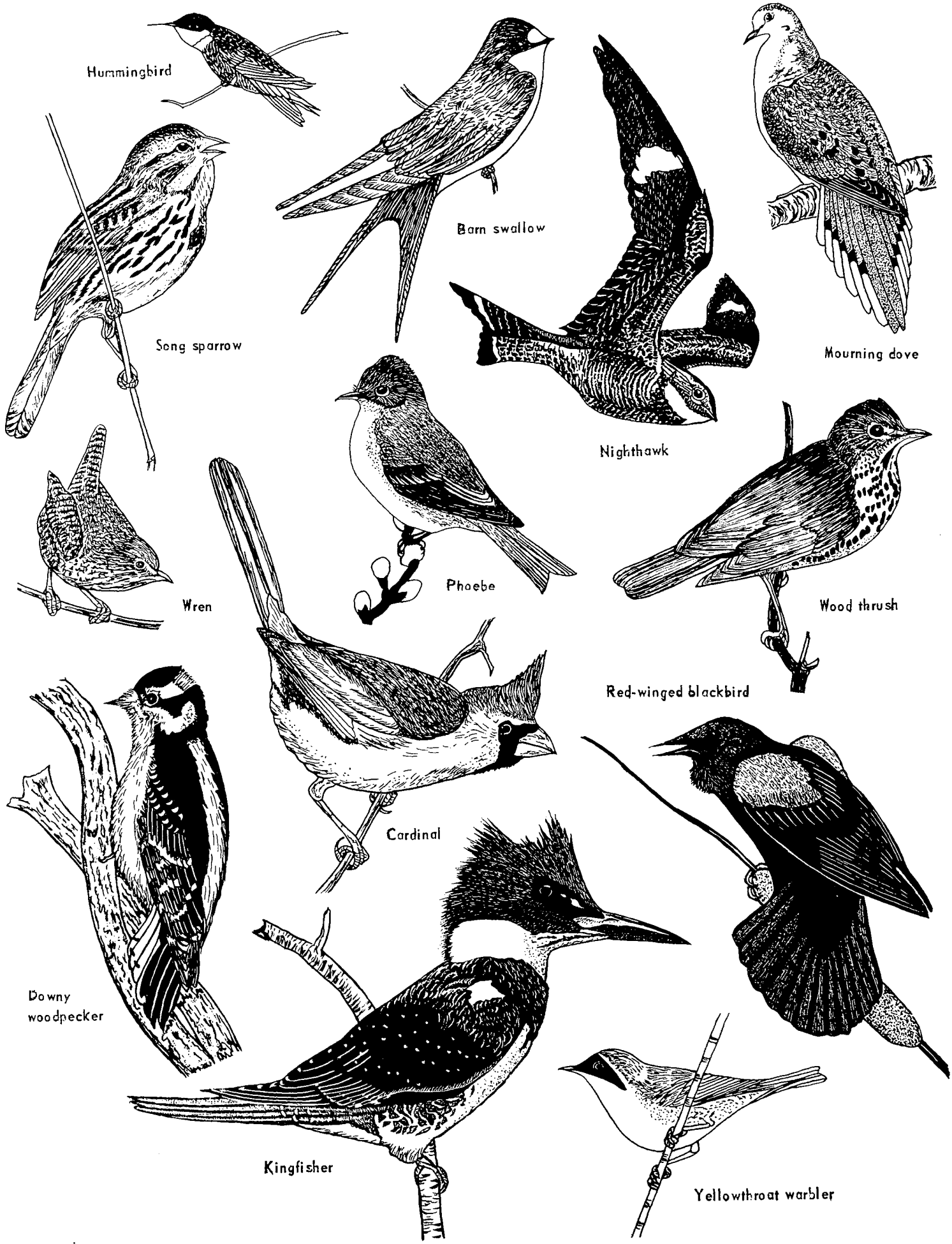
The birds in this "catch-all" group are very interesting, and a few are quite beautiful, and the aesthetics attached to this group are considerable.

Group	Habitat	Range and Season	Food and Value
LOONS AND GREBES 7 kinds. Horned Grebe typical.	Lakes, marsh ponds, rivers.	Most restricted, a few state-wide. Summer residents and rare visitors.	Fish, insects, aquatic invertebrates. Neutral.
CORMORANTS 1 kind. Double-crested Cormorant.	Lakes and rivers.	State-wide during migration. Local in summer.	Fish, aquatic invertebrates. Neutral to beneficial.
SWANS 2 kinds (1 nearly extinct). Whistling Swan typical.	Larger lakes and rivers.	State-wide during migration only.	Aquatic vegetation, grasses, insects. Neutral.
AUKS, MURRES AND PUFFINS Dovekie (1 record); Ancient Murrelet (1 record).	Typically ocean-loving birds.	Accidental.	Fish, molluscs and aquatic life. Neutral.

Song Birds

This is a very large group of birds which are usually quite colorful (with many absolutely beautiful!) and generally possessing characteristic songs. As contrasted with other general groups of birds, they are usually smaller and are the typical birds of the fields and forests.

Many hundreds of people in Wisconsin observe and study birds with the aid of a good field guide and a pair of binoculars. It is healthful and extremely interesting to get afield often and spend some time admiring the variety and beauty of plumage and song of our native birds. It would be well worth it to become acquainted with at least a few of these pretty little songsters for they might point the way toward enthusiasm for nature hikes and a completely enjoyable method of relaxation.


Hummingbird
Barn swallow
Song sparrow
Nighthawk
Mourning dove
Phoebe
Wren
Wood thrush
Red-winged blackbird
Cardinal
Downy woodpecker
Kingfisher
Yellowthroat warbler

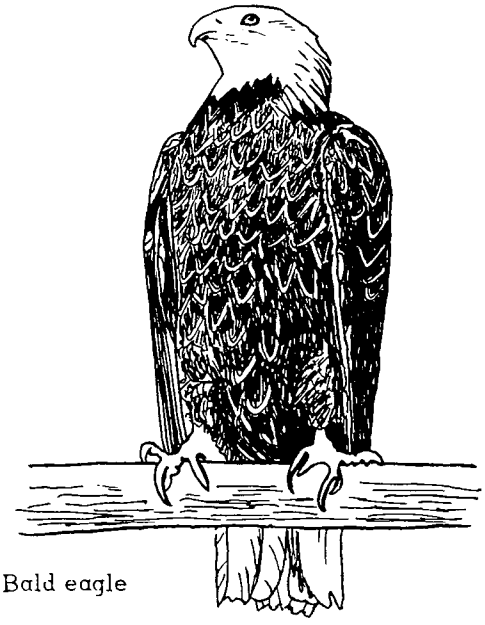
Group	Habitat	Range and Season	Food and Value
PIGEONS AND DOVES 3 kinds (1 introduced; 1 extinct). Mourning Dove typical.	Open to semi-open country. Farmlands.	State-wide. Rock dove — year round. Mourning dove — summer (local in winter).	Primarily seeds and grains. Neutral to beneficial.
CUCKOOS 2 kinds. Yellow-billed Cuckoo typical.	Forests and forest edge, thick hedgerows.	1 state-wide, 1 restricted, summer.	Mostly insects, especially caterpillars. Beneficial.
WHIPPOORWILLS AND NIGHTHAWKS 3 kinds (1 highly improbable). Nighthawk typical.	Forests with openings and open country.	State-wide. Summer.	Primarily flying insects. Beneficial.
KINGFISHERS 1 kind. Belted Kingfisher typical.	Borders of lakes, rivers and streams.	State-wide. Summer (local in winter).	Small fish, frogs, insects, crayfish. Neutral.
WOODPECKERS 10 kinds (2 rare). Red-headed Woodpecker typical.	Forested areas.	Most species somewhat restricted. Most resident all year.	Insects, spiders and other invertebrates found in and on trees. Beneficial.
HUMMINGBIRDS AND SWIFTS 2 kinds. Ruby-throated Hummingbird and Chimney Swift.	In cities, over lakes and open country and in semi-open forests.	Bath species state-wide. Summer.	Swift—flying insects. Hummingbird—flower nectar, very small insects. Beneficial.
FLYCATCHERS 14 kinds (a few species quite rare). Wood Pewee typical.	Forests, semi-open country and open country.	Some restricted and some state-wide. Summer.	Flying insects of all types, primarily. Probably small spiders. Beneficial.
LARKS 3 kinds. Prairie Horned Lark typical.	Open farmlands, and waste fields.	State-wide. 1 year round; 2 winter.	Weeds, grains, insects, spiders. Beneficial.
SWALLOWS 6 kinds. Tree Swallow typical.	Open country, over lakes and rivers.	Most species state-wide. Summer.	Flying insects of all types; probably small spiders. Beneficial.
CROWS AND JAYS 6 kinds (2 very rare). Blue Jay typical.	Forested and semi-open country. Farmlands with woodlots.	2 state-wide, 4 restricted. Residents all year and very rare visitors.	Insects, seeds, nuts, animal and plant matter. Omnivorous. Neutral to harmful (certain species in certain areas).
TITMICE, CREEPERS AND NUTHATCHES 7 kinds (2 rare). Chickadee typical.	Forested and semi-open country. Farmlands with woodlots.	Some state-wide, others restricted. Residents all year and visitors.	Small insects, spiders and other small invertebrates. Beneficial.
WRENS AND THRASHERS 10 kinds (1 rare). Catbird typical.	Brushy woods, woods edges and thickets.	Some restricted, some state-wide. Summer.	Insects, berries, small invertebrates. Beneficial.
THRUSHES 11 kinds (a few very rare). Wood Thrush typical.	Mostly woodlands. Semi-apen to open country.	Some state-wide, some restricted. Summer. (Robin lacally in winter.)	Earthworms, insects and wild berries and fruits. Beneficial.
KINGLETS AND GNATCATCHERS 3 kinds. Ruby-crowned Kinglet typical.	Woodlands, semi-open to open country.	1 restricted, 2 state-wide during migration. 1 (summer); 2 during migration.	Principally small insects. Beneficial.
WAXWINGS 2 kinds. Cedar Waxwing typical.	Semi-open to forested country.	State-wide. 1 year round, 1 winter visitor.	Wild fruits and berries, insects. Beneficial.
SHRIKES 2 kinds. Northern Shrike typical.	Open country with woodlots and hedgerows.	State-wide. 1 winter, 1 summer.	Small birds and mammals, large insects, etc. Beneficial.
VIREOS 7 kinds (2 rare). Red-eyed Vireo typical.	Woodlands.	Some state-wide, same restricted. Summer.	Small insects and caterpillars, other small invertebrates. Beneficial.
WARBLERS 37 kinds (a few rare). Magnolia Warbler typical.	Woodlands and along streams bardered with brush.	Many state-wide in migration, others restricted. Some are summer residents.	Small insects and other small invertebrates. Beneficial.

Group	Habitat	Range and Season	Food and Value
MEADOWLARKS, BLACKBIRDS AND ORIOLES 12 kinds (1 very rare). Red-winged Blackbird typical.	Mostly open country and woods edges.	Some restricted, some state-wide. Most summer residents. A few species locally in winter.	Seeds, grain, insects and other invertebrates. Most beneficial. Cowbird harmful to nesting birds.
TANAGERS 3 kinds (1 very rare). Scarlet Tanager typical.	Woodlands.	1 state-wide, 2 restricted. Summer.	Chiefly insects, with other small invertebrates.
GROSBEAKS, SPARROWS, LONGSPURS AND CROSSBILLS 52 kinds (many rare). Song Sparrow typical.	All types of land habitat used by this large group.	Many restricted, many state-wide. Some year around, some summer and some winter residents.	Seeds, grains, insects and small invertebrates. Beneficial.
STARLING AND ENGLISH SPARROW (introduced species)	Farmlands primarily and cities.	State-wide; year around residents.	Seeds, grains, insects, rubbish. Nuisances.
WAGTAILS 1 kind. American Pipit.	Drymarshes, prairies, lake shores.	Statewide, during migration. Nonresident.	Small insects and invertebrates. Beneficial.
CAROLINA PAROQUET Old records. Now extinct.			

Birds of Prey

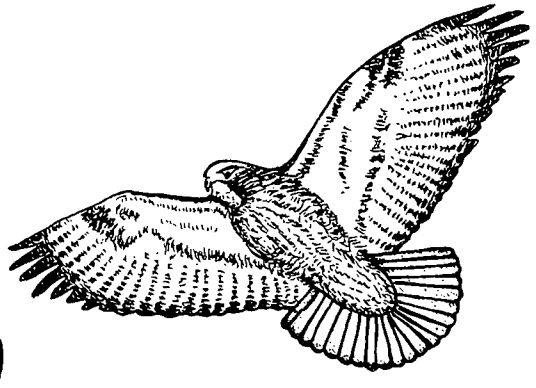
Many of the vultures, hawks, eagles and owls are among our most beneficial birds, since their food consists mainly of small mammals, especially rodents. Most of these birds are quite common and have been seen by everyone. Hawks are interesting to watch while in flight for they are very graceful, and many are quite brightly colored.

Most of the group are about medium in size while a few such as the eagles and vultures are large. All are powerful for their size and have sharp talons and a strong curved beak designed primarily for tearing flesh. If an occasional hawk or owl becomes a nuisance to farmers by developing a liking for chickens, it should be destroyed. However, wholesale destruction of hawks and owls would be very foolish since in general they do much more good than harm.



Bald eagle

Turkey vulture



Red-tailed hawk

Screech owl

Group	Habitat	Range and Season	Food and Value
VULTURES			
1 kind. Turkey Vulture.	Rocky bluff country and open farmlands primarily.	State-wide. Summer resident.	Primarily dead animals. Useful as a scavenger.
HAWKS			
Red-tailed Hawk typical. 17 kinds (a few rare).	Generally in or near open to semi-open country.	Many state-wide. Some restricted. Summer and winter visitors and residents.	Small animals, usually rodents. Some individuals take chickens. Beneficial.
EAGLES			
2 kinds (1 rare). Bald Eagle typical.	Rocky bluffs, and along river and lake shores.	Northern and western Wisconsin generally. Summer residents and visitors; local in winter.	Some animals and fish. Beneficial.
OWLS			
13 kinds (some rare). Screech Owl typical.	Wooded areas with open areas intermixed. Marshes and fields.	Some state-wide, year around residents. Others visitors.	Small animals primarily. Beneficial.

REPTILES

Snakes, lizards and turtles are the representatives of this class of animals in Wisconsin. A fourth group, the crocodiles and alligators, are found only in the tropics and sub-tropics. Reptiles, unlike mammals and birds, are cold-blooded.

Generally most species of snakes and lizards prefer land, while most species of turtles prefer water.

Reptiles are certainly important animals, many from the standpoint of being beneficial and many from the standpoint of being harmful, especially the poisonous snakes. In Wisconsin many hundreds of thousands of rodents and other small mammals are killed every year by the larger snakes alone, and considering the reproductive capacity of rodents, this amounts to considerable control over these injurious animals. Lizards feed primarily on insects and small invertebrates and are therefore considered beneficial, while many species of turtles feeding on insects, vegetation and fish are more difficult to rate exactly. Reptiles of all kinds are used as food by many other animals, and larger turtles are eaten by man.

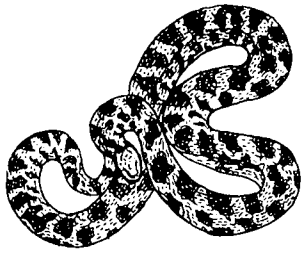
Most people are "afraid" of snakes above everything else, but it is common for those who become more acquainted with snakes and their true values to actually begin to appreciate them and to defend them from others!

A fact of great importance is that we have only *2 species of poisonous snakes in Wisconsin,* both rattlesnakes. These two species are isolated in their ranges and in the following table we will show a range map for these animals in Wisconsin. All the rest of our snakes are NOT poisonous.

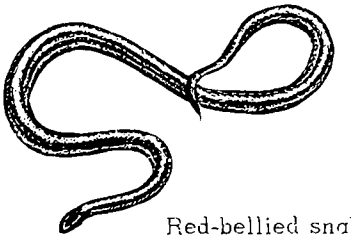
Currently there are 40 species and subspecies of reptiles in the state: 23 snakes, 4 lizards and 13 turtles. Some are very rare while others are common. A few species recorded long ago have probably become extirpated in Wisconsin.

As far as snake numbers are concerned, the rattlesnake population runs perhaps into the tens of thousands, garter snake populations number in the hundreds of thousands, and small brown, green and red-bellied snake populations reach up to a few million. Cold, "open" winters with their deep frosts periodically reduce snake populations.

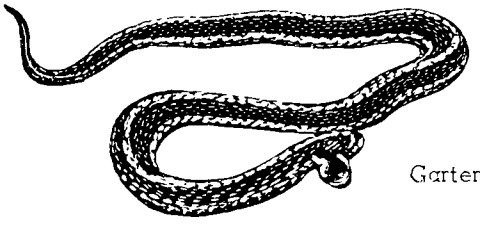
Group	Habitat and Range	Food	Importance Rating
SNAKES			
Brown Snakes (3 kinds). Red Bellied typical.	Fields and woods edges; thin woods. Usually hiding under ground debris. 1 state-wide; 2 restricted.	Earthworms and small insects and invertebrates.	Neutral to beneficial. Non-poisonous.
Watersnakes (4 kinds). Northern Water Snake typical.	Borders of creeks, rivers and lakes. Take refuge in water. 1 state-wide; 3 very restricted.	Frogs, salamanders, fish, crayfish and larger invertebrates.	Mostly neutral. Harmful in some areas. Non-poisonous.
Garter Snakes (4 kinds). Eastern Garter Snake typical.	Lake, creek and river margins, grassy fields, swales and hillsides. 1 state-wide; 3 restricted.	Frogs, salamanders, earthworms, small fish, occasionally small mammals.	Neutral. Harmful (eats frogs). Non-poisonous.



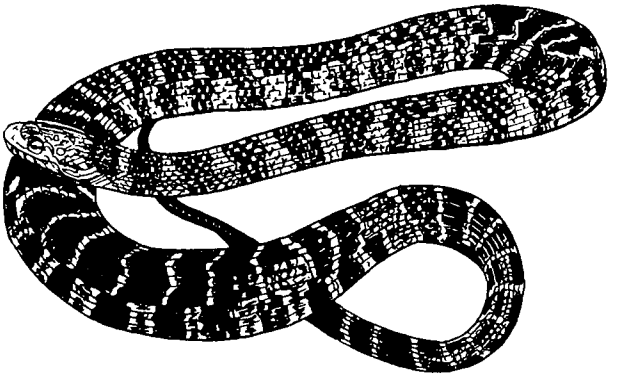
Fox snake



Red-bellied snake



Garter snake

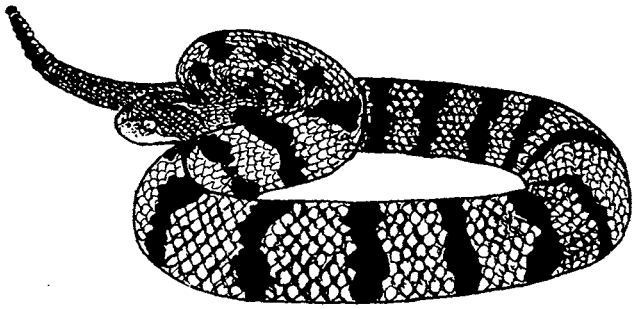


Banded water snake

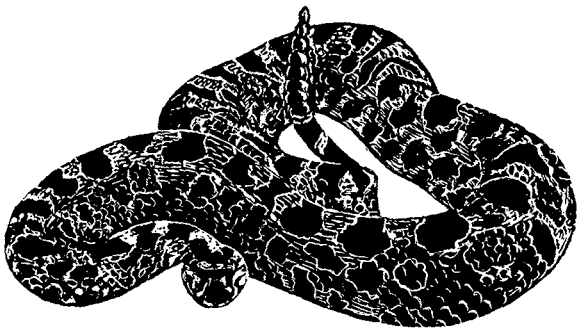
Group	Habitat and Range	Food	Importance Rating
Hog-nosed Snake	Open fields and hillsides. Prefers sandy areas. Southern ¾ Wisconsin.	Principally toads. Will eat frogs and larger insects.	Harmful since it destroys toads. Non-poisonous.
Ring-necked Snakes (2 kinds).	Thinned woods under stones, bark, slab-wood. Rocky wooded hillsides. 1 state-wide; 1 restricted.	Small salamanders, earthworms, small snakes and lizards.	Neutral. Non-poisonous.
Blue Racers	Open fields, marshes and very thin woodlands. Dry rocky areas. Southern ½ Wisconsin.	Rodents, small birds, lizards, frogs, insects.	Beneficial. Non-poisonous.
Smooth Green Snakes (2 kinds).	Open grassy fields and grassy woodlands. Both restricted.	Principally insects, earthworms and small invertebrates.	Beneficial. Non-poisonous.
Bullsnake	Open grassy areas, dry rocky hillsides. Southern ½ Wisconsin.	Mostly rodents, sometimes small birds and eggs.	Very beneficial. Non-poisonous.
Rat Snakes (2 kinds). Fox snake typical.	Farmlands, open woods, valley areas, marshes. 1 state-wide; 1 restricted.	Mostly rodents, sometimes small birds.	Very beneficial. Non-poisonous.
Milk Snakes	Farmlands, open woods, rocky hillsides, marshes. Southern ½ Wisconsin.	Rodents primarily, often other snakes, including rattlesnakes.	Very beneficial. Non-poisonous.
Rattlesnakes Timber Rattlesnake.	Rocky, dry hillsides and nearby fields and lowlands. Western and southwestern Wisconsin.	Primarily rodents and other small mammals. Birds.	Diet is beneficial. This snake is **very poisonous.**
Massasauga Rattlesnake.	Marshy areas and more open swamps with sunny, dry slopes nearby. West central and western Wisconsin.	Small rodents, small birds, frogs, snakes.	Diet is beneficial. This snake is **very poisonous.**

New first-aid procedures are now recommended for rattlesnake-bite: Identify the snake and if possible kill it and take it with you. Immobilize the bitten part as much as possible. Walk (do not run) to your car and drive to the nearest doctor and obtain anti-venom shots.

The older methods of first-aid treatment should only be used when you cannot quickly and calmly get to a doctor: use of a tourniquet in combination with cutting and suction to remove the poison. For specific first-aid procedures, refer to a qualified first-aid manual.



Timber rattlesnake



Massasauga

solid black areas on maps show range of each rattler

old records

Group	Habitat and Range	Food	Importance Rating
LIZARDS			
Skinks (2 kinds). 5-lined Skink typical.	Dry, sandy areas in open fields and thin woods. Both restricted.	Primarily insects and other small invertebrates.	Beneficial, non-poisonous.
Racerunners	Dry, sandy areas in open fields and on rocky hillsides. Southwestern Wisconsin.	Primarily insects and other small invertebrates.	Beneficial, non-poisonous.
Glass Lizards	Open meadows and thin woods, prefers sandy areas. Southern ⅓ Wisconsin.	Insects, small lizards and small snakes, bird eggs.	Beneficial, non-poisonous.
TURTLES			
Snapping Turtles	Lakes, rivers, creeks, ponds, marshes. State-wide.	Most kinds of smaller aquatic animals. Aquatic plants.	Harmful in some lakes. Dangerous bite, but not poisonous.
Wood Turtles	Rivers. Often on shore in woods. Central ½ Wisconsin.	Insects, earthworms, berries, vegetation.	Neutral.
Musk Turtles	Bottoms of rivers and lakes. Southern ¼ Wisconsin.	Insects, fish, dead animals on lake bottoms.	Beneficial.
Map Turtles (3 kinds). Map Turtle typical.	Lakes and rivers and large creeks. All restricted.	Fish, insects, snails, etc.	Neutral.
Painted Turtles (2 kinds). Midland Painted Turtle typical.	Lakes, rivers, creeks, ponds and drainage ditches. 1 state-wide; 1 restricted.	Insects, fish, earthworms, aquatic plants.	Neutral.
Box Turtles	Dry, sandy areas. Seldom near water. Very restricted.; southwestern Wisconsin.	Insects, earthworms, vegetation, berries.	Neutral.
Semi-Box Turtles *Blandings Turtle.*	Shallow, weedy bays of rivers and lakes. State-wide.	Insects, earthworms, vegetation, berries.	Neutral.
Soft-Shelled Turtles (3 kinds). Spiny Soft-shell typical.	Lakes and rivers and some large creeks. 1 state-wide; 2 restricted.	Fish, crayfish, molluscs, etc.	Neutral.

AMPHIBIANS

Frogs, toads and salamanders are contained in this class. Everyone can identify a frog or a toad, and salamanders look like lizards with smooth, glistening, moist skins, and bulging eyes. Amphibians are cold-blooded, like the rest of the "lower" animals, and their body temperatures change with their surroundings.

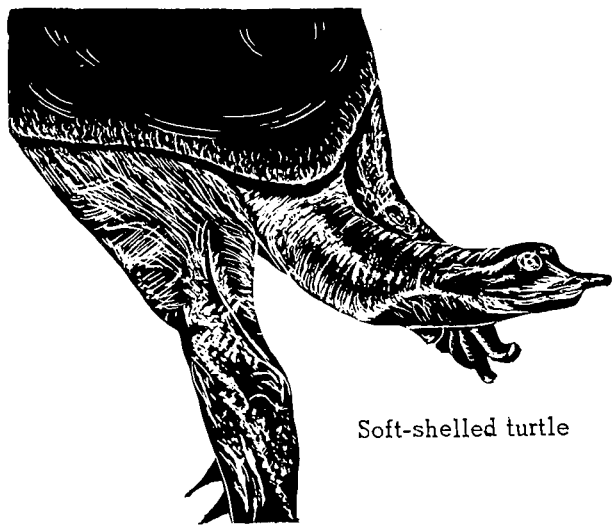
All amphibians require habitat types that are wet, such as marshes, swamps, moist woodlands, streams, ponds and potholes. Wetland drainage can exterminate the resident amphibians in a very short time.

Amphibians are very important animals since most of them feed principally on insects and other invertebrates, and practically every kind of an amphibian is eagerly sought by other animals for food. Even man eats the legs of the larger frogs, especially the bullfrog. Many species of frogs are used as bait by fishermen, while the leopard frog is used often in biological research. Frog songs are interesting and are one of the first animal songs heard in spring. Many types of amphibians are kept indoors in moist terraria as pets.

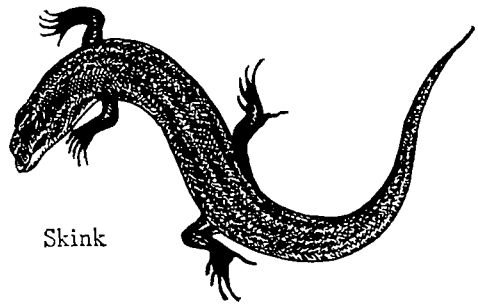
Most amphibians breed in the water, lay their eggs and spend a larval or tadpole period in the water, then transform into an adult. As adults they live on moist land types, returning to water only to breed, escape enemies or keep themselves wet.

Our most recent tally of amphibians species and sub-species in Wisconsin shows that we have 8 kinds of salamanders, 1 toad and 11 kinds of frogs, for a total of 20 different kinds. The total number of individuals in Wisconsin is probably in the high millions since we are so richly blessed with water, and since the reproductive capacity of most amphibians is exceptionally high. If you will but ponder for one minute the number of insects destroyed each year by this vast army of amphibians, some individuals eating hundreds of smaller insects in one day, you can see why they should be protected in every way possible.

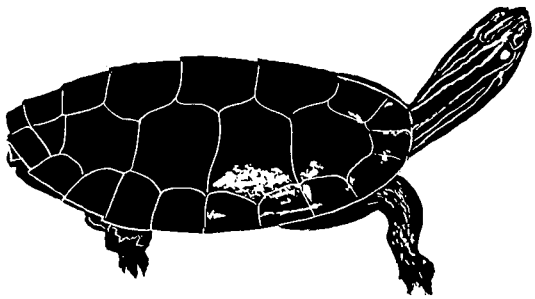
No amphibians have poisonous bites, and the toad does not cause the handler to grow warts.



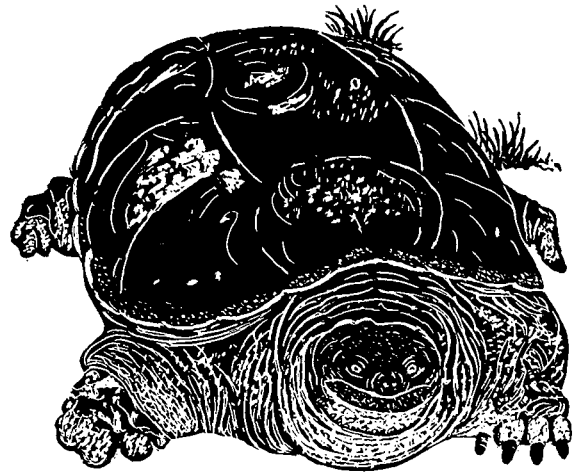
Soft-shelled turtle



Skink

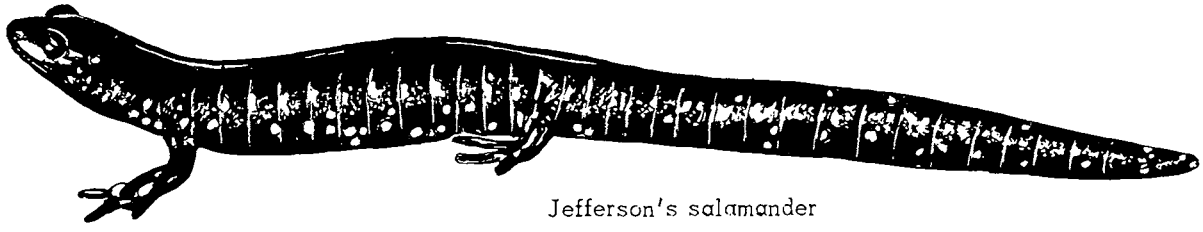


Geographic turtle

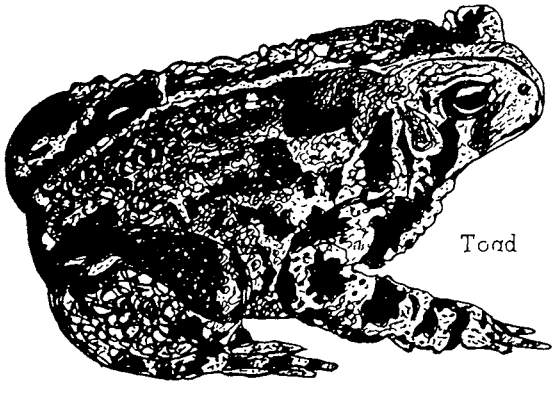


Snapping turtle

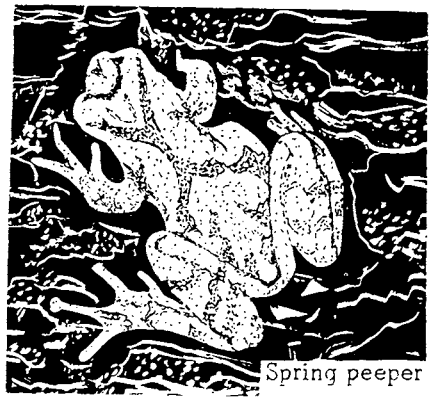
Group	Habitat and Range	Food	Importance Rating
SALAMANDERS			
Mudpuppies (2 kinds).	Bottoms of rivers and lakes all their life. 1 state-wide. 1 restricted.	Earthworms, insects, and small fish, etc.	Harmful as it often destroys fish eggs.
Pond Newts	Shallow, weedy waters. Usually in water, often on land. State-wide.	Invertebrates, especially earthworms.	Neutral. Makes a good aquarium species.
Mole Salamanders (3 kinds). Tiger Salamander typical.	Young — ponds. Adults — land. 2 almost state-wide, 1 restricted.	Earthworms, invertebrates.	Neutral to beneficial. Hardy terrarium pets.
Woodland Salamanders (2 kinds). Red-backed Salamander typical.	Damp litter and rotted logs in woodlands. 1 state-wide, 1 restricted.	Earthworms, small invertebrates.	Neutral.
TOADS AND FROGS			
Toad (1 kind).	Yaung — ponds. Adults — land. State-wide.	Principally insects. Other invertebrates.	Very beneficial.
Tree Frogs (5 kinds). Spring Peeper typical.	Young — ponds. Adults — land and water. Most kinds state-wide.	Principally small insects.	All beneficial.
True Frogs (6 kinds). Leopard Frog typical.	Young — ponds. Adults — land and water. Most kinds state-wide.	Principally insects. Larger invertebrates and small vertebrates are taken by the larger individuals.	Very beneficial.



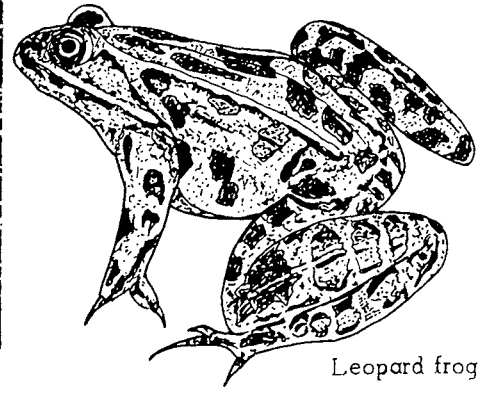
Jefferson's salamander



Toad



Spring peeper



Leopard frog

FISH

Wisconsin is richly blessed with water — and therefore has many kinds of fish — about 174 different species recorded in Wisconsin.

The fish populations of lakes and streams form an important source of food. However, the ever-increasing value of recreational fishing has surpassed the food value of most of our fishery resources.

Fish can be grouped in the following categories: sport or game fish, minnows, rough fish, and commercial fish. The sport fish are species regularly caught by hook and line which have premium recreational values. Some sport fish may also be commercial fish, the perch, catfish, and lake trout falling in this category on the bigger waters. The term "minnows" usually refers to small species which are used mainly for bait. Technically, however, "minnow" is the term applied to a family of fish which lack teeth in their jaws but have pharyngeal teeth. The carp is a minnow.

"Commercial" fish are species which are abundant, and best caught with nets or other commercial gear. Catfish, carp, cisco, lake chubs, white-fish, smelt, perch, suckers, freshwater drum (sheepshead) are all commercial species.

"Rough fish" are species generally regarded as undesirable or detrimental, and their release alive is prohibited by law. Many species legally termed rough fish are commercial species, the carp, and drum especially. Predator species of rough fish such as dogfish and garfish are not now regarded as being so detrimental as they were once thought to be.

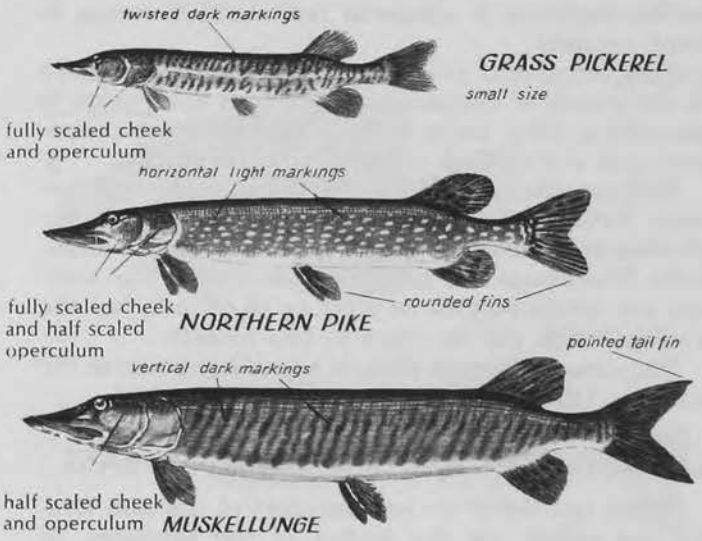
MUSKELLUNGE AND NORTHERN PIKE

The muskellunge and the northern pike are the aquatic "wolves of the forest," feeding on any and all smaller fishes and other animals. They, in turn, are among the prize game fishes because of their excellent sporting qualities and large size. Because of their predatory habits, it is seldom possible to have abundant mixed populations of these species in a single lake, and the natural invasion or stocking of northern pike into native musky waters has been accompanied, usually, by a decrease in the muskellunge population. Propagation of muskellunge continues to be an important part of the Conservation Department's program while research is increasing the benefits to the angler through better methods of production and stocking of these fish.

The 1955 legislature designated the musky as the state fish in recognition of its abundance in Wisconsin as compared with other states and the high regard which this species is accorded as a game fish throughout the nation. An accurate estimate of the number of muskellunge taken in Wisconsin in a given year has not been possible because of the widespread nature of the fishery. The following information, compiled by one resort operator, gives a good picture of the size distribution of the muskies caught during a four-year period. Of 465 muskies tallied, 423 were between 30 and 39 inches long, 40 fish measured between 40 and 49 inches, and only 2 were 50 inches or more. The two largest fish weighed 31 and 36 pounds, respectively.

The Wisconsin record for the muskellunge caught by hook and line is a 69 pound 11 ounce fish 63½ inches long caught in the Chippewa Flowage, Sawyer County. Northern pike run smaller, the largest measuring about 50 inches. Growth of both species is rapid with 20-inch specimens common at the end of two years and 30-inch specimens in 4 to 5 years.

The muskellunge's home lies in the northern lakes while the northern pike has a state-wide distribution.

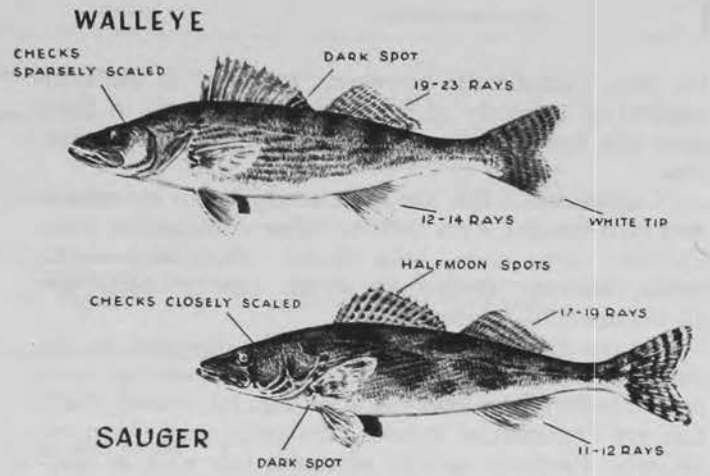


Both species commonly lurk in weed beds. Crosses between muskellunge and northern pike have occurred and these species have a small cousin called the grass pickerel.

WALLEYE AND SAUGER

The walleye is the big brother of the yellow perch and the mammoth of the entire perch family which includes a great host of pigmy-sized fishes, one of which seldom gets more than an inch long. The walleye is one of the most important species in the sport and commercial fisheries of a large portion of the United States and Canada. While it is most often erratic and unpredictable in its willingness to take a hook, it is universally regarded as one of the finest food fishes.

The walleye is predatory and sometimes becomes the dominant fish in a mixed population. Management of this species is difficult because of the marked fluctuations in natural reproduction from one year to the next and the above-mentioned unpredictability of



angling success. Intensive research on Escanaba Lake in northeast Wisconsin indicates that this fish can withstand moderately heavy fishing pressure without undue depletion if adequate reproduction occurs in most seasons.

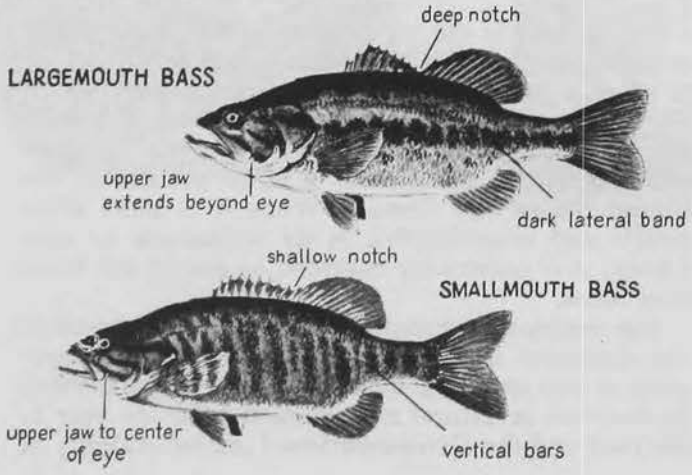
Because of the prime importance of the walleye to the people of Wisconsin and because of its value in restocking lakes under certain conditions the propagation of this fish will continue to be important.

Walleye attain their greatest abundance in moderately fertile, open-water lakes which have incoming streams or wave-washed beaches for spawning grounds. Lake Winnebago is a good example of this. The walleye will attain weights as great as 18 pounds, but the average catch will be closer to two pounds.

The sauger, or sand pike, is a smaller cousin of the walleye. It occurs in the large lakes and rivers.

LARGEMOUTH AND SMALLMOUTH BASS

These two fishes are not members of the bass family but rather are the largest of the sunfishes, of which the bluegill, black crappie and rock bass are more typical examples. Fish managers do not regard the largemouth and small mouth primarily as fish-eaters since preferred foods also include crayfish, aquatic insects and other invertebrates. These fish are very highly regarded for their sporting qualities and may be taken readily on many artificial or natural baits.

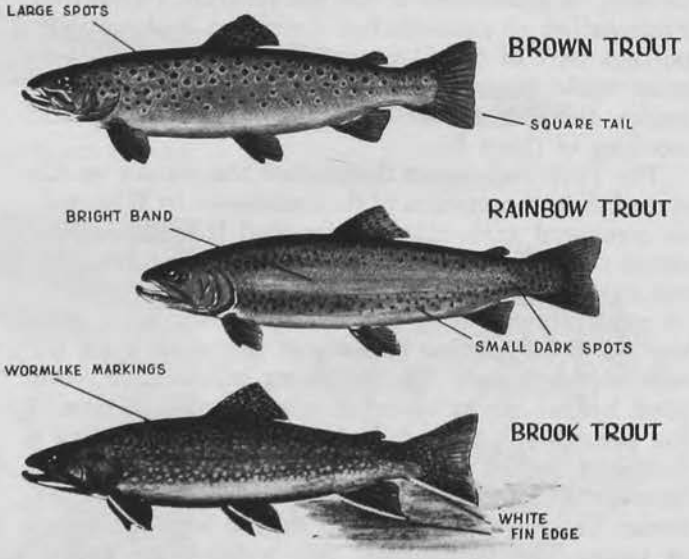


These nest-builders, particularly the largemouth, are able to maintain a high population in the face of heavy fishing pressure. This has resulted in the discontinuance of the artificial propagation of these fishes and has permitted further liberalization of angling restrictions. More restrictive regulation of the smallmouth, however, may be necessary in the future.

The two species exhibit wide differences in their preferred habitat. The largemouth is typically found along the shores of small weedy lakes and ponds while the smallmouth is a usual inhabitant of the gravel and rocky shoals of the Great Lakes or of the rocky riffle and pool areas of warm-water streams. In the proper environment the largemouth bass can offer exceptional fishing opportunity. For example, Yellowstone Lake was created as a 450-acre impoundment in southwest Wisconsin in the summer of 1954, and planted with two-inch bass. During the following fishing season, 4,038 anglers caught 12,402 bass averaging nearly ten inches in length.

The record largemouth for Wisconsin weighed 11 pounds and the record smallmouth, 9 pounds. They will commonly attain a length of 10 inches in two to three years; 14 to 16 inches are common sizes for adults.

BROOK TROUT, RAINBOW TROUT, AND BROWN TROUT



Wisconsin's climate and water supply are favorable to maintaining populations of trout in suitable lakes and streams. These fishes, and other members of the salmon and trout family, have historically been considered as favorites of anglers.

Trout require spring-fed streams to furnish spawning grounds, and as a general rule, streams richly endowed with springs will have the best trout populations. They do not tolerate warm waters, hence the requirement for spring-fed streams and deep lakes.

Recent fish management has stressed the maintenance of trout populations in small, deep, inland lakes where planted trout do well but where natural reproduction is usually lacking. These introduced trout populations in lakes are popular among anglers. The heavy fishing pressure on lakes does not bring about the public indignation which follows put-and-take stocking of streams. The maintenance of trout fishing in streams in recent years has been emphasized by an over-all approach to watershed stabilization and proper land use. Many state demonstration areas and a large list of projects conducted cooperatively with local groups testify to the public approval of this program.

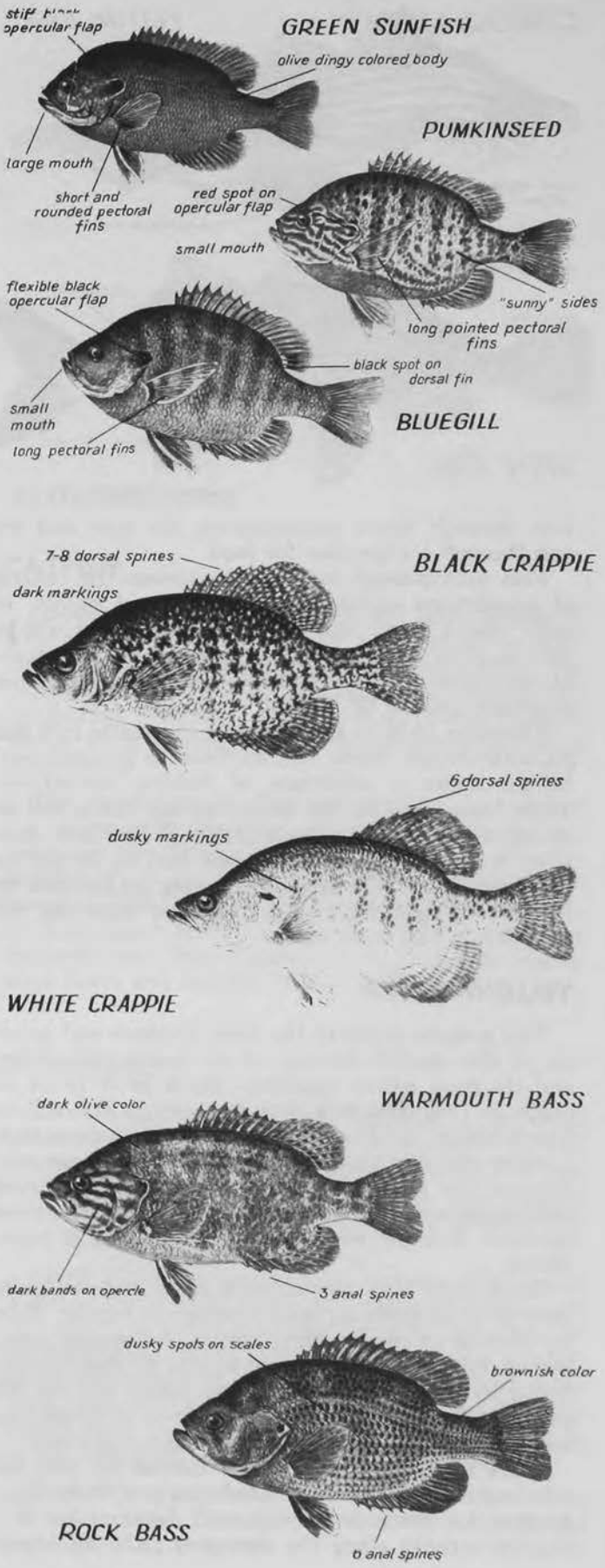
Despite the general belief that trout streams are badly depleted by anglers during the long open season, there is evidence that many good trout streams in Wisconsin continue to suport large populations for future seasons. As one example, three miles of Lawrence Creek (Adams and Marquette Counties) has not been stocked since 1949, and has been open to angling each year under the usual regulations. In the fall of 1954, 18,000 brook and rainbow trout were still present in this stream, some of them 15 inches long. The Kinnickinnic River (Pierce and St. Croix Counties) is another stream that support a heavy population of brown trout even after a season of very heavy fishing pressure.

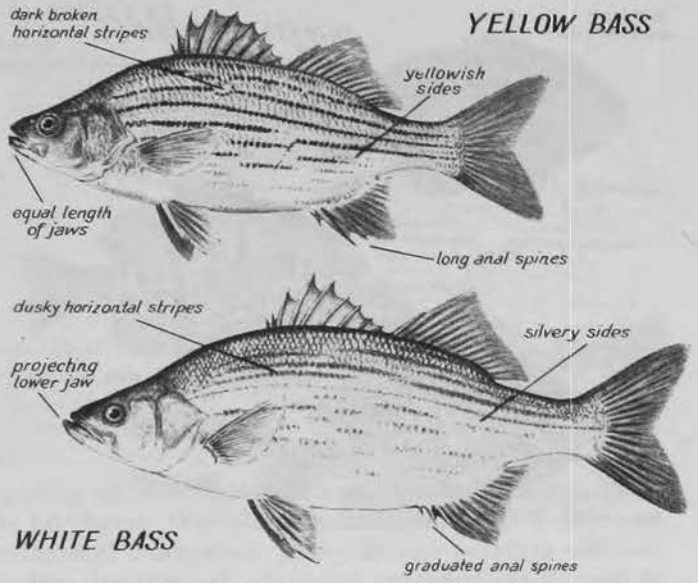
The brook trout is a native fish while brown and rainbow trout are introduced species. The brook trout is also the most catchable of the three, followed by the rainbow. These trout species are all capable of rapid growth and they are short-lived, seldom living to be more than five years old. Rainbow have been well adapted to life in lakes. Since the brook trout mature at smaller sizes and do not grow as large, management of this species may differ from the other two. A unique fishery is provided by rainbow and brown trout that run into the streams flowing into Lake Superior.

PANFISH

Perch, bluegills crappies, pumpkinseeds and rock bass are the bread-and-butter fishes of Wisconsin anglers. This group and other small-sized species are collectively called panfish. Undoubtedly more hours of recreation and more fish dinners come from the utilization of this group than from the larger game fishes. These panfish are all nest builders and they have demonstrated their ability to maintain adequate reproductive rates in the face of heavy fishing pressure. Actually, many of the most serious problems in the management of these fishes are caused by the over-population of lakes with panfish resulting in a shortage of fish food and consequently smaller sized fish for the angler.

There is also evidence that overabundant panfish populations have a detrimental effect on the reproduction of other game species such as large-mouth





bass through direct predation on the eggs and fry and through competition for food.

Fish management for panfish stresses the control of populations within the available food supply, in order that a larger share of the fishes present will be able to grow to a large size preferred by fishermen. Management also favors an increased harvest of these abundant species by anglers.

Escanaba Lake in Vilas County illustrates how fish populations can thrive and continue to produce good fishing under a minimum of fiishing restrictions. There have been no size limits, no bag limits and no closed seasons on any kinds of fish in this lake since 1945. Yet fishing in 1955 was the best on record for this lake with 3,474 anglers catching 20,441 fish by the end of September. The panfishes made up the majority of this large catch.

YELLOW PERCH

This species is one of the most common and popular of the panfish because of its ready catchability and its good eating qualities. Perch grow to be as much as 12 inches long, but the average fish will be 8 or 9 inches. It has a short life span of no more than 7 years and often not more than 5. Perch are relatives of the walleye and they are often associated with walleye in their native habitat. They are most common in lakes with moderate amounts of vegetation.

Perch have high reproductive rates and are quite capable of maintaining their numbers naturally. They lay ribbons of eggs in early spring. A common problem in lakes with large populations is stunting induced by over-population — too many fish for the available food supply. The abundance of perch has been grounds for removing the bag limit on them.

There is a commercial fishery carried on with gill nets and trap nets on Lake Michigan and Green Bay. Angling for perch from piers and breakwaters is a favorite activity along the shores of Lake Michigan.

BLUEGILL

The bluegill shares honors with the perch as the most abundant and most readily caught of the panfish species. They are most common in weedy lakes an dare often referred to as bug pickers. The smack of a bluegill sucking in an insect from the surface is a typical sound. Bluegills usually attain desirable size (6 inches) in three to four years; a 10-inch fish is considered to be large sized. They belong to a family of nest builders. In late spring the male will hollow out a nest and induce females to come in and lay their eggs. While they are on the beds is a good time to catch them.

This species has a high reproductive rate and will build up into immense population of 100 pounds or more per acre. Stunting is a common management problem, and sometimes biologists and fish managers have found it most expedient to eliminate a stunted population with chemicals and start over.

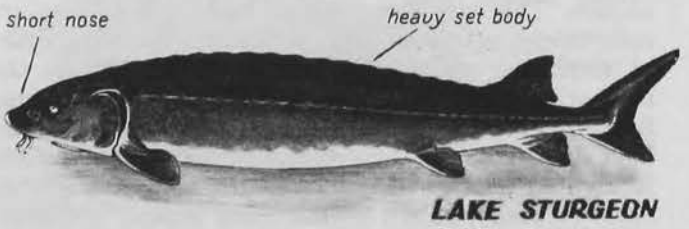
Bluegills have many relatives including large and smallmouth bass, the crappies, rockbass, warmouth bass, pumpkinseed sunfish, green sunfish and other sunfish. It is common to harvest 30 pounds per acre from good bluegill lakes.

MINNOWS

The minnows of the lakes and streams of Wisconsin form an important natural resource in at least two ways. They constitute an abundant natural food for many of the preferred game fishes and they are extensively harvested from natural waters or reared in private ponds and sold by commercial bait dealers for angling purposes.

Raising, catching and selling minnows was estimated to be a $1.200,000 business in 1957. Most of them are caught in the natural waters by seining or trapping.

The popular definition of minnows is "any small fish." The technical definition includes all species in the minnow family among which the goldfish and German carp. The statutory definition of a "minnow" includes many kinds of fishes that are not in the minnow family but excludes most of the important game



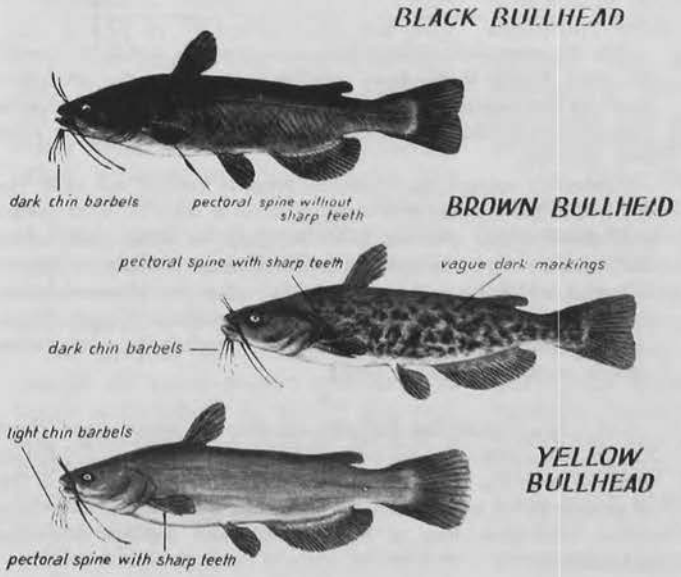
and panfishes. Thus mudminnows, topminnows, muddlers, mad-toms, trout-perch, log perch, suckers and red horse are not true minnows and conversely, carp and goldfish are true minnows despite their large size in natural waters. The many kinds of chubs and shiners and the bluntnose and fathead minnow are the important kinds to the bait dealer. Minnows are good bait for fish-eating species such as northern pike, muskellunge, walleye, large and smallmouth bass, crappies, white bass and perch.

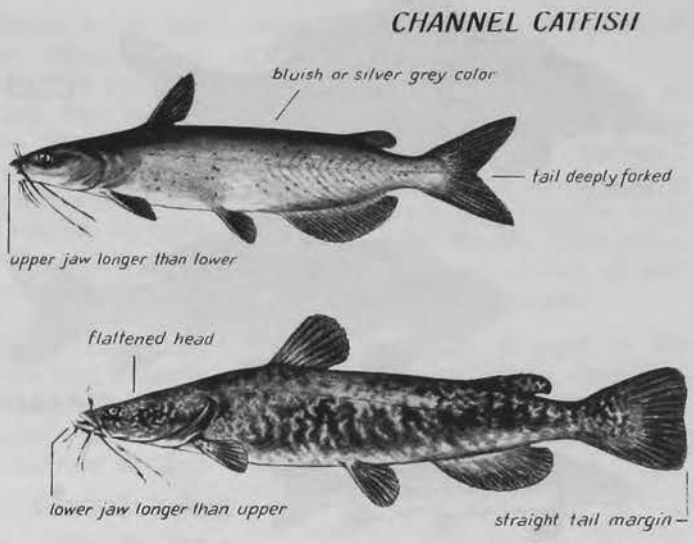
LAKE STURGEON

The lake sturgeon deserves special mention because of its unique life history and large size. Perhaps it should be designated "king" of Wisconsin fishes because it gets to be the largest and oldest fish living in the state. A lake sturgeon 83 years old and weighing more than 150 pounds was speared in Lake Winnebago during the winter of 1954.

The species grows slowly and is large sized before attaining maturity. Males mature when about 42 inches long and 14 years old. Females are larger and mature later, at a size of 54 inches and 25 years of age. These facts are grounds for a conservation management policy, a high minimum size and a low bag limit.

The lake sturgeon was once common in all the Great Lakes and in most of the large lakes in northeastern United States. The sturgeon populations have been drastically reduced nearly everywhere; the present good population of this fish in the Lake Winnebago area remains the largest concentration in the United States today. Management measures to maintain this resource and to allow harvesting only the surplus are being carefully planned on the basis of sound biological knowledge of the habits of this species and the rate of exploration by the public. A harvest of 2,600 fish totaling 85,000 pounds in 1955 was probably the highest in many years.





FLATHEAD CATFISH

CATFISH

Catfish are residents of rivers and lakes associated with rivers. Here in Wisconsin two species are common, the channel catfish and the flathead catfish. The flathead catfish lives in the big rivers such as the Mississippi, Wisconsin and Fox-Wolf Rivers. Channel catfish occur in most rivers of the southern two-thirds of the state.

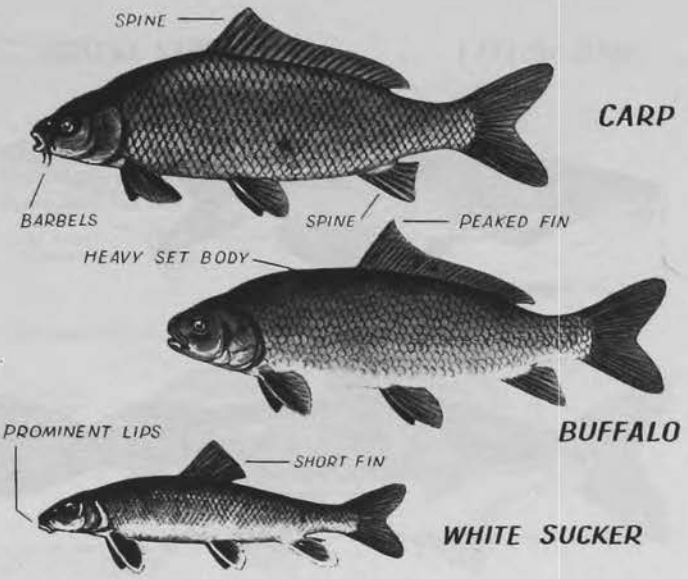
The channel cat is often the principal game fish of the rivers and they are an important commercial catch on the Mississippi. Channel catfish grow to lengths of about 2 feet and attain weights of 15 pounds. Flathead catfish grow to 60-pound weights. It takes about three years for a catfish to grow to a desirable size. The commercial catch on the Mississippi River was 440,000 pounds in 1958.

BULLHEADS

There are three species of bullheads, the black, brown and yellow. They live on the bottom and feed mostly at night. Tactile whiskers help greatly to locate food and feel objects at night. Success with catching them comes from fishing the bottom. Almost any kind of a bait will work.

These species are also nest builders. The brown bullhead tends to be more often associated with rock and sandy bottoms than the other species and the black bullhead seems to be more common in muddy-bottomed situations. Bullheads can withstand warm water and low oxygen. Thus they are often the only species that will survive in shallow weedy lakes subject to winterkill and summerkill conditions.

Bullheads grow to lengths of about 14 inches. Growth is rapid. Densities of hundreds of pounds per acre have been reported.



LAKE TROUT

Lake trout is entirely a lake resident as contrasted with other trout species which usually live in streams or at least require streams for spawning. Lake trout spawn on gravel or rock reefs in the fall. It requires clear cold lakes and will die if the water becomes too warm. Only three inland Wisconsin lakes and the Great Lakes have proved acceptable for the lake trout.

Lake trout grow slowly and attain maturity when relatively large. A female will usually be 24 inches long and 7 years old when mature. Thus conservative management of this species is necessary. The minimum size has always been 17 inches. Weights of 40 pounds are sometimes attained. They have always been an important commercial fish in the Great Lakes where they are principally caught with gill nets. The commercial catch averaged about 3,200,000 pounds yearly for Wisconsin ports. The sea lamprey depredations have reduced this harvest to zero on Lake Michigan and brought the harvest down to about 260,000 pounds yearly on Lake Superior. Great effort is being made to control the lamprey.

INLAND COMMERCIAL FISH

Perhaps these fish are better known as "rough fish" because included are carp, common sucker, redhorse, buffalo and freshwater drum or sheepshead. Most are not readily caught on hook and line and some, particularly the carp, are capable of serious environmental destruction to the detriment of game fish. They are, however, better referred to as commercial fish because of the immense numbers marketed annually. In 1958, 13,860,000 pounds of these fish were caught in the Mississippi and inland waters. Some idea of the significance of carp in the commercial landings on the Mississipi may be seen by noting 69 per cent of the commercial catch is carp. Most of these species are bottom feeders.

Rough fish are caught in seines and trap nets. Many are shipped alive to eastern markets, and a significant portion goes into foods for farm-reared fur animals, especially mink.

GREAT LAKES COMMERCIAL FISH

Commercial fishing in the Great Lakes is concerned principally with cold-water species, the trout (already mentioned), whitefish, shallow-water cisco, deep-water cisco (chubs), smelt and more recently alewives. These species are caught mostly by gill nets, and trap nets are employed in shallow water. In the last few years the trawl has proven to be a practical method for catching low-value fish.

The species composition of the catch from Lakes Michigan and Superior in one recent year (1958) follows:

Species	*Lake Michigan*	*Lake Superior*
Lake trout	....	258,998
Whitefish	9,230	88,491
Chubs (deep-water cisco)	5,495,098	544,868
Herring (shallow-water cisco)	1,401,590	2,496,151
Perch	2,292,655	....
Suckers	378,434	16,676
Carp	1,226,838	5
Catfish	506	....
Bullheads	21,135	....
Smelt	2,944,020	348,841
Walleye	5,895	....
Northern pike	11,226	....
Sheepshead (drum)	577	....
Alewife	978,639	....
Menominee	24	17,056
Burbot	....	1,490

Lake fisheries have been beset with serious invasions which have upset normal yields. The lamprey invasion has eliminated predator fish in Lake Michigan and greatly reduced the large whitefish, ciscos and chubs, and it has reduced the number of large predator fish in Lake Superior. Other invasions have been the rapid rise of the smelt beginning in the 1930's. More recently alewives have become extremely abundant. Unfortunately, they have low commercial value. An abundance of low quality and small fish lends emphasis to the need for more efficient methods of harvest than the traditional gill net, a role which may perhaps be filled by the trawl.

The Conservation Department is continually trying to provide the most fishing at the least possible cost, within the production limits of the natural environment. This, of course, means that the Department should rely on the natural reproduction of fish wherever possible.

Numerous surveys and research projects carried out each year show that most lakes and streams have a high level of natural reproduction, and stocking is unnecessary. In some cases habitat development can be substituted for stocking particularly on streams. Effective use of fish management tools such as stocking and habitat development requires classifying streams or portions of them. Stream classification is underway and has been applied to some streams already, such as Lawrence Creek.

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Lakes face competition for both shoreline and water space. Therefore, in managing lakes we have to be mindful of space and habitat needs of both the resources and the people using them. To do this, all aspects of the use of lakes are being studied: boating, swimming, access, and protection of fish, wildlife and outdoor enjoyment possibilities.

OTHER WISCONSIN ANIMALS

Besides the hundreds of kinds of vertebrate animals referred to in the previous pages, Wisconsin has many thousands of species or kinds of invertebrate animals — those animals that do not have a backbone.

Invertebrates can be found on every square foot of land and in every cubic foot of water and the number of individuals in the state is beyond comprehension. Since we are "overrun" with such armies of invertebrates of diverse forms and habits, it is very easy to see that they must play a tremendously important role in any biological or ecological community. We will present some "facts and figures" on the major groups on the following pages. We must of necessity be very brief, for a treatment of all the invertebrates of Wisconsin, on even a family basis, would take a number of volumes! Exact numbers of species in Wisconsin within each group are impossible to determine, since most collections and records representing each group are incomplete. Some small groups have barely been worked on because of their complexity and large numbers of species.

So far as their significance to man and his interests, invertebrates serve a major purpose as "buffers." They form basic food requirements for other predaceous species and, therefore, keep these predators from killing larger numbers of animals of importance to man.

A few examples of most of the groups are shown in the drawings. All are approximately in proportion so far as their relative size is concerned, except as marked.

Spiders and Relatives

This group, called the arachnids, is composed of a number of smaller groups each containing many species. The groups represented in Wisconsin are the harvesters, spiders, mites and ticks.

Harvesters

Harvesters or "daddy longlegs" are abundant and familiar to all but there are relatively few species to be found in Wisconsin. They are "grown up" and very numerous by fall, hence their name harvesters. They eat other insects, mites and small spiders, and in general are beneficial. They are not feared as much as the true spiders. Common harvester typical.

Spiders

Spiders of many dozens of kinds are found in Wisconsin all the way from the large false trap-door spiders to the small jumping spiders. All are predaceous on insects and other small invertebrates, including other spiders, and most have the habit of either stalking or running at their prey and pouncing on it. Some species catch their prey in webs such as the garden spiders and funnel-web spiders.

All spiders have eight legs and nearly all have poison glands and fangs with which to inject the poison. However, the bite of all but a fraction of the species is quite harmless to humans, being seldom worse than a mosquito bite.

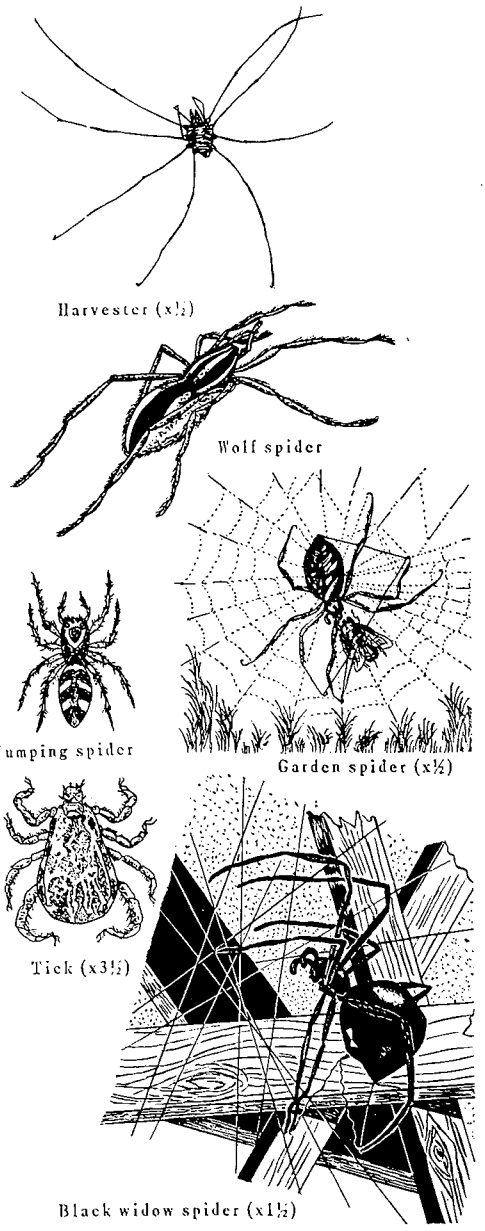
The black widow spider, of which everyone has heard, is found in southern Wisconsin, especially the southwestern counties. In spite of its reputation of being terribly fatal, it is not really that bad. Less than 10 per cent of the people bitten by this spider succumb and these individuals are usually people with poor health to begin with. The bite is very painful, however, and should be treated by bleeding, suction and dilute ammonia. A doctor should be called.

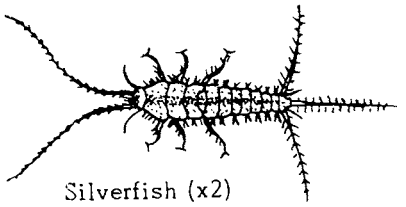
In general spiders can be classed as extremely beneficial animals, since they kill so many insects and other small pests. Wolf spider, garden spider, black widow and jumping spider typical.

Mites and Ticks

There are quite a few species in Wisconsin representing this group. The mites in general are very small and many are parasitic on animals and man, while others feed on small animals and decaying plants. To this group belong the troublesome itch mite and the chigger, the later being too familiar to many people!

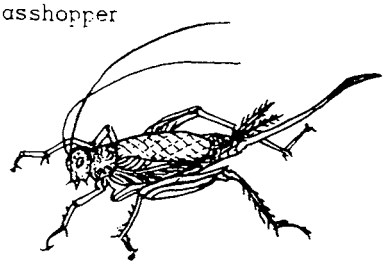
The ticks are generally much larger than the mites and are very common in many parts of Wisconsin where they attach themselves to animals and man. There are not a great number of species in Wisconsin, but they are very abundant during the spring and early summer months. Both ticks and mites suck blood and the larger ticks are especially noticed on short-haired animals when they swell to the size of marbles. In general this group is neutral. Common chigger and woodtick are typical.



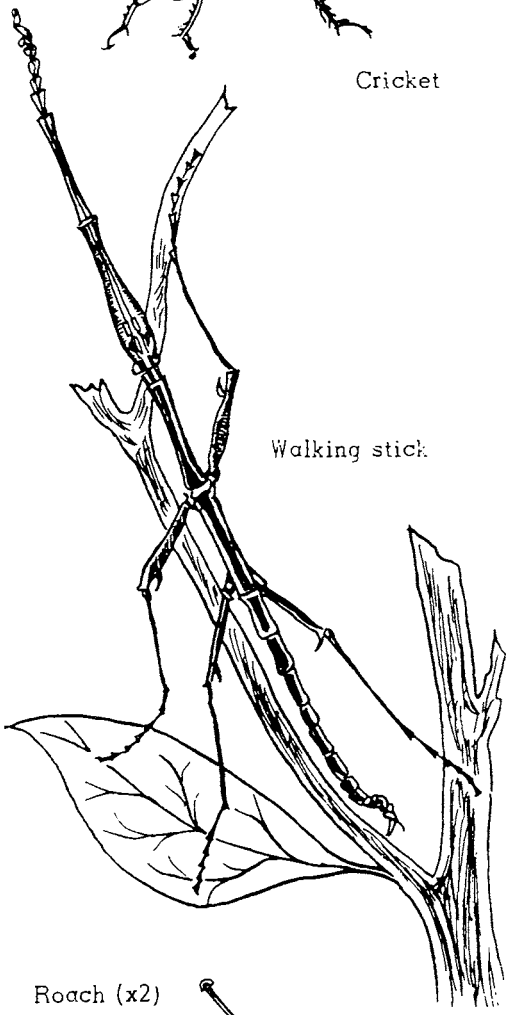


Silverfish (x2)

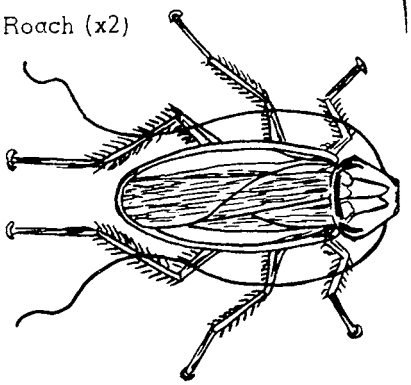
Grasshopper



Cricket



Walking stick



Roach (x2)

Insects

Over 650,000 kinds of insects have been classified to date in the world and it is estimated that there are hundreds of thousands more yet to be discovered; therefore, it is understandable when we say that Wisconsin's insect world alone contains at least a few thousand species. We actually do not know the total number of species to be found in Wisconsin at present, but that is because it is such a mammoth job to determine this. The University entomologists will be working on this phase of entomology for many years to come.

In general, most insects are either neutral or beneficial to mankind, and many add beautiful touches of color to our world. But there are still hundreds of species that are very harmful in many different ways. General value ratings will be given the insect groups as they appear on following pages but here it should be mentioned that insects form a very broad base in the foundation of the animal world for there are relatively few animals that do not eat insects at one time or another and many hundreds of kinds of animals that subsist entirely on insects or other closely related groups of small invertebrates.

Certain groups of insects will be omitted because of their relative unimportance and poor representation in Wisconsin.

Most of the groups are represented by various species in all parts of the state.

Bristle-tails, Silverfish and Fire-brats

Very few species known in Wisconsin, but a very common one in houses is the silverfish. It is fond of starch and if abundant in homes and libraries, can cause damage to book bindings, starched clothes, etc. Everyone has seen these insects scurrying about in dusty corners, old suitcases, etc. Silverfish typical.

Spring-tails

There are relatively few species of spring-tails known in Wisconsin, but what they lack in variety, they make up in abundance. Wherever there is decaying vegetation, you will find dense numbers of these very small insects. Most species are seen as you do garden or lawn work very close to the ground. They are the small grayish insects that literally "bounce-all-over-the-place" when disturbed. Some black species can be found on the surface of small ponds near the shoreline. They are neutral to beneficial, breaking down vegetable matter and forming food for other small animals. They occur on snow on warm winter days. Spring-tail typical.

Locusts, Grasshoppers, Crickets, Cockroaches and Walking Sticks

There are dozens of kinds of insects belonging to this group that are commonly found in Wisconsin. The group is represented mostly by locust and grasshopper species and these are known to everyone, for once summer is underway, they are very common in any field. Certain types of locusts are very large and when they become abundant, they cause much damage to farm crops and gardens. Many adult locusts have quite pretty wings and when in flight, these colors are easily seen. Grasshoppers and locusts are herbivorous. Red-legged locust and katydid typical.

Crickets are not represented by many species in Wisconsin, but their songs in late summer and fall indicate that there are many individuals in the field nearby. They are more omnivorous in their diets than are the grasshoppers and are fond of chewing up clothing, shoes, etc. left lying on the ground. Common field cricket.

Our few native species of cockroaches are found primarily in the out-of-doors and are not typically destructive insects. A few species of cockroaches have been introduced from foreign countries and these are the destructive species often found in houses where they do much damage. They are omnivorous. Common wood roach typical.

Walking sticks are odd insects resembling a twig with legs. Unless looked for, they are seldom seen, though outbreaks of them occur at times and they become very destructive to the foliage of trees. One species occurs in Wisconsin and it is herbivorous. Northern walking stick typical.

Dobsonflies, Lacewing-flies, Ant-lions and Others

This is an important group of insects with a number of species occurring in Wisconsin. The larvae of all species feed as predators on other insects and small invertebrates. Most kinds spend a larval stage in water and are usually abundant enough to be an important fish food. The larva of the dobsonfly is the hellgrammite so familiar to fishermen. The aphis-lions and ant-lions are larvae of beautiful lacey-winged adults. These larvae destroy countless numbers of aphids and ants. Dobsonfly and lacewing-fly typical.

May-flies

Wisconsin has quite a few species of this group of insects and they are known to most outdoorsmen by their "hatches" or sudden appearance of vast hordes of them. The larvae of all may-flies are aquatic and are herbivorous. Adults do not eat anything and live only a few days. These insects are eagerly sought by fish for food and by fishermen for bait. Common May-fly typical.

Dragon-flies and Damsel-flies

Wisconsin probably has a couple dozen species of this group and since their larvae are aquatic, and since we have so much water, we are blessed with countless individuals. Both the larvae and adults feed on other insects almost constantly and they may be classed as one of our most helpful insects. The larger dragon-flies or "ear-stingers" are known to all. Most of the adult insects are very pretty and are very swift, yet graceful fliers. Dragon-fly and damsel-fly typical.

Stone-flies

The number of species of stone-flies found in Wisconsin is not known, but it is probably rather small. They are abundant though in the vicinity of fast-flowing streams and it is here that their larvae live under stones and feed on other insects. They are important as food for trout and other fast-water species. Stone-fly typical.

Book-lice and Psocids

The book-louse is the common, very small, grayish white insect that one sees when old books and papers that have been lying in damp cellars, etc., are handled. They feed on the paste holding papers together. They seldom become abundant enough to do harm to books. There are few species in this group. Book-louse typical. Psocids are common, small winged insects of the out-of-doors and there are a number of species of them in Wisconsin. Psocids typical.

Bird-lice

Few species of bird-lice have been recorded in Wisconsin, but many probably remain yet to be discovered. They feed on the feathers of birds and some kinds are found on mammals where they feed on hair. They infest pets and are known to most people that have kept birds. Bird-louse typical.

Thrips

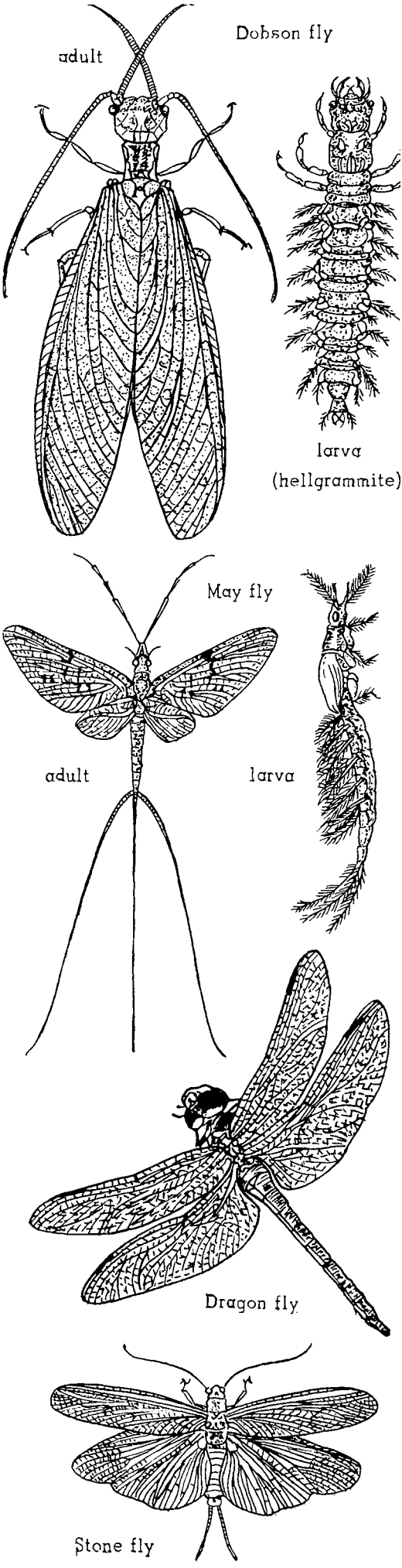
Few species of thrips have been recorded in Wisconsin, but the kinds we do have often occur in large numbers. They are very small insects found in flowers and on other plants where, if they become abundant, they cause much harm to the plant by sucking sap. Thrips typical.

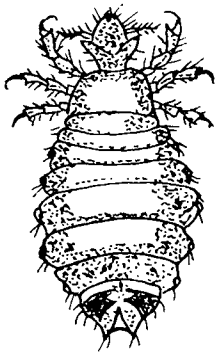
True Lice

These are the small sucking insects that often infest animals and even man. There are only about 300 species known in the world, and Wisconsin therefore has very few kinds. They are blood-suckers and besides the discomfort they give their hosts they are known carries of a number of dreaded diseases. Common dog-louse typical.

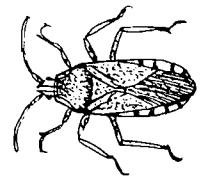
True Bugs

Nearly 100 kinds of true bugs are known in Wisconsin at present and this, coupled with their staggering numbers and ability to suck plant sap, makes them a very destructive and highly important group of insects in Wisconsin. Some varieties suck blood and other juices from animals. Most species are land forms, but many water forms are also known. They vary in size from the large "electric-light" bug to the smaller plant bugs. Squash bug, stink-bug typical.

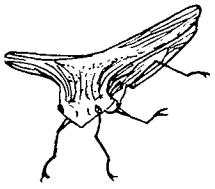




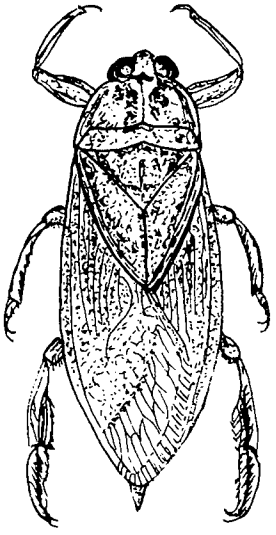
Louse (x7)



Squash bug

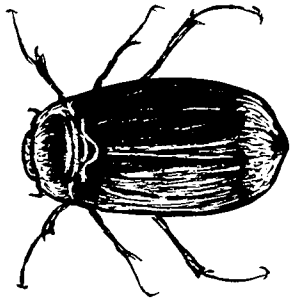


Leafhopper (x2)

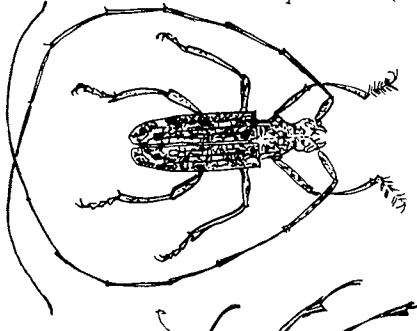


Electric light bug

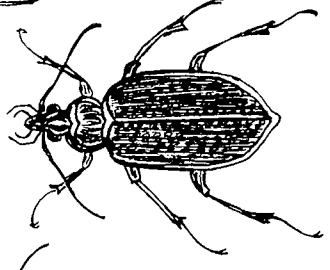
Cicada



May beetle (x1½)

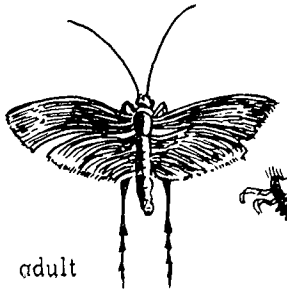


Longhorn beetle

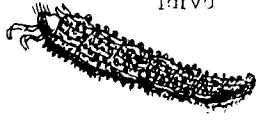


Caddis fly

Ground beetle



adult



larva

Cicadas, Aphids, Leaf-hoppers and Others

Well over 150 species of this group occur in Wisconsin with more to be found. These insects are equipped with sucking mouth parts too and are strictly sap feeders. Aphids and leaf-hoppers are known to farmers and gardeners because of their destructive roles. Cicadas are heard every year in the trees at which time they are wrongly called locusts. The cicadas are the largest species and are few in number compared to the smaller species which dominate this group. Cicada, aphid and leaf-hopper typical.

Beetles

This is the group of insects with the largest number of species. There are over a quarter of a million species known in the world with thousands more yet to be discovered. Wisconsin has more than 1,500 species that are known currently.

All beetles pass a larval stage and are known then as grubs. By far the majority are herbivorous in their diets, while many kinds are predaceous feeding on living invertebrates. Others are scavengers feeding on dead animals.

All beetles and their grubs possess chewing mouthparts. Everyone is familiar with the destruction that can be caused by many beetle species to plants of garden, forest and field. Some kinds eat foliage while other kinds bore right into the stem of the plant. The predaceous beetles on the other hand are very beneficial in that they destroy countless trillions of other injurious insects annually in Wisconsin. Typical of harmful beetles are the June beetle, flea beetle, scolytid beetle, apple-tree borer. Typical of the beneficial beetles are the ladybird beetle, sylphid beetle, tiger beetle and hunter beetle.

Scorpion-flies

This is a small group with few species in Wisconsin. Their caterpillar-like larvae feed on dead insects and fruits. The adults are attractive, fragile-looking insects. Scorpion-fly typical.

Caddice-flies

There are many species of caddice-flies in Wisconsin, though it is not known how many. The larvae of these insects live in the water and almost all of them build cases around themselves for protection. They form a very important food source for trout and trout fishermen are well acquainted with them. The adults emerge in "hatches" much like the may-flies and adult caddice-flies are moth-like in appearance. Common caddice-fly typical.

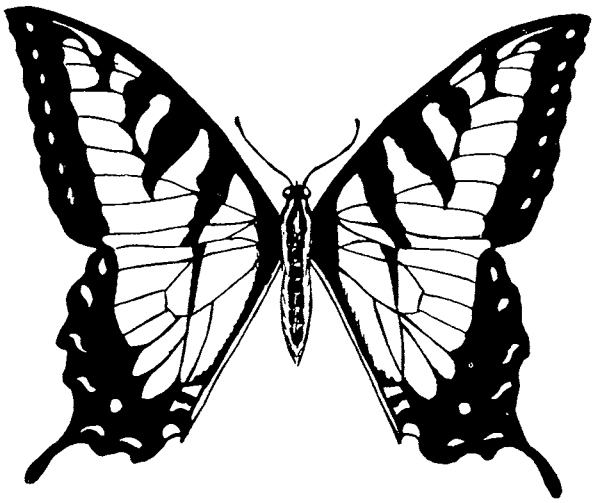
Butterflies and Moths

There are probably nearly one hundred kinds of butterflies found in Wisconsin and there are hundreds of species of moths. Both general types are well-known to everyone. A large number of butterflies and moths are very beautiful and are the favorite insects of most amateur insect collectors.

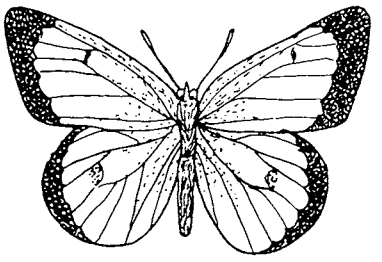
They have a larval stage in which they are called caterpillars and from this stage they pass into a chrysalid stage and then into an adult stage. The larvae of many species feed on our important food plants and can become very destructive. Other species attack garden flowers and forest trees, often doing considerable damage. Adults are fitted with tube-like sucking mouths and feed on nectar, sap and rotted fruits, moist decaying vegetation and carrion. Tiger swallowtail, sulphur butterfly and fritillary typical of butterflies. Cecropia moth, sphinx moth, underwing moth and noctuid moth typical.

True Flies

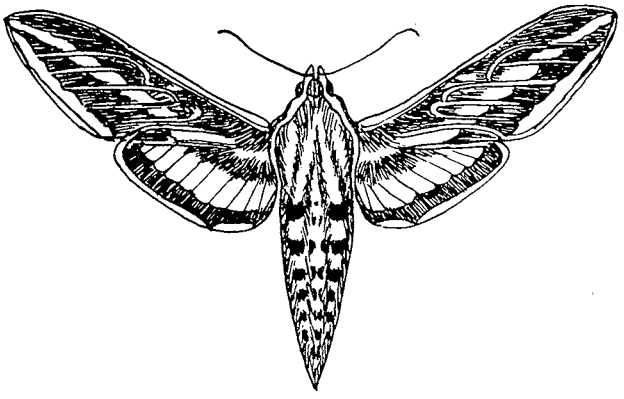
Close to 100 species of flies are listed for Wisconsin, but the list is very incomplete. Many more kinds than this exist in our state. Probably the list will soar into the hundreds. In the larval stage many are known as maggots. They feed on a variety of substances too numerous to mention; many are scavengers helping to clean up decaying plant and animal life while the larvae of others feed on aphids and other soft-bodied insects. Robber flies feed on other insects. Many species such as house-flies spread disease by walking over food, while others such as mosquitos, deer-flies and black-flies spread disease by sucking blood. As a group, it is very beneficial in some respects and very harmful in others. This group forms an important food source for swallows, bats, etc. House fly, mosquito, deer-fly and robber fly typical.



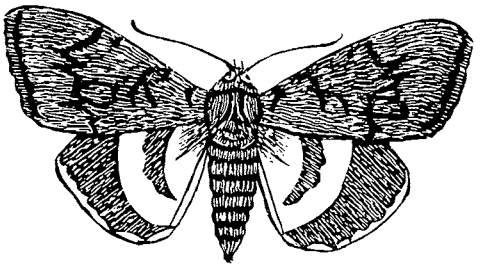
Tiger swallowtail butterfly



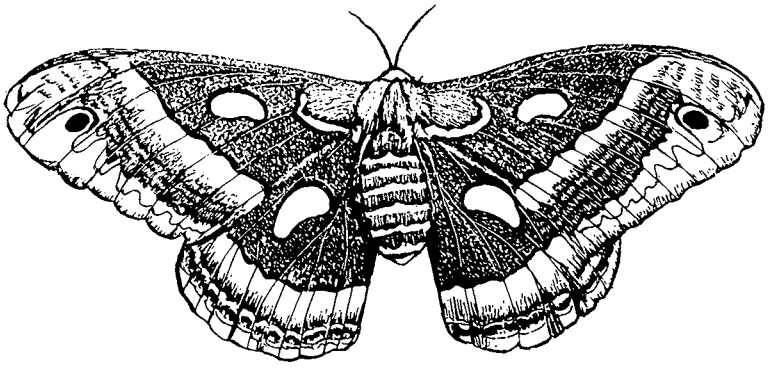
Sulphur butterfly



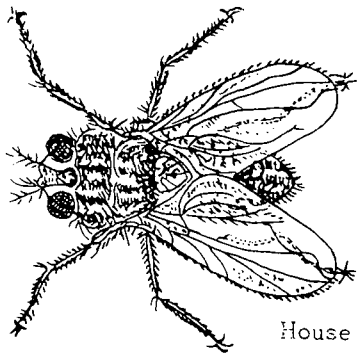
Sphinx moth



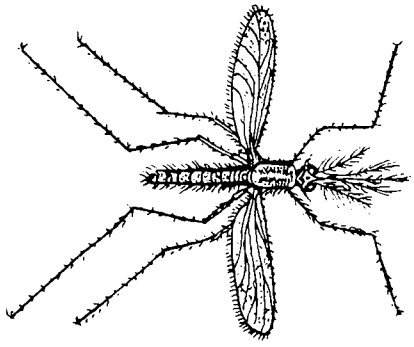
Underwing moth



Cecropia moth (x½)

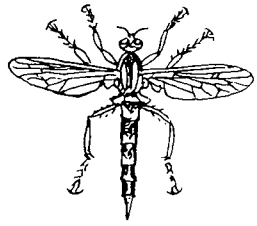


House fly (x4)

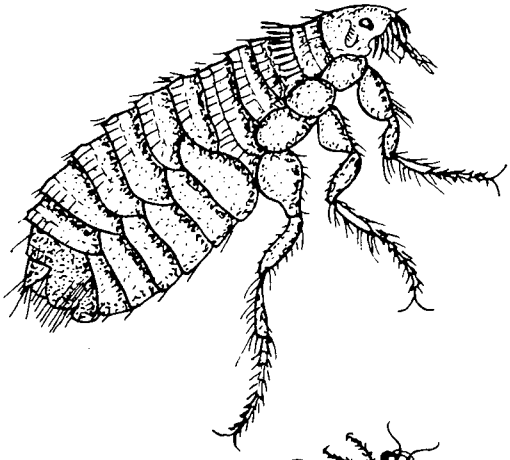


Mosquito (x3)

Deer fly (x1½)

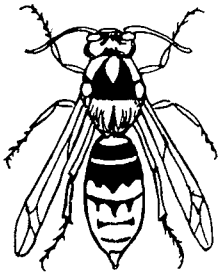


Robber fly



Dog flea (x30)

Honey bee



Hornet

Ant (x1½)

True Fleas

There are many species of fleas to be found in Wisconsin and these are found on many species of animals. How many kinds we have is not known, but it probably runs into the dozens. The larvae of fleas are seldom seen, but the adults are often seen gliding through the hairs of our pet dog or cat. They have sucking mouth parts through which they draw blood from the body of their hosts. They are pests of the first order and are known carriers of many diseases. Common dog flea typical.

Bees, Wasps, Ants, Ichneumons and Others

This very large group of insects has over 100,000 species recorded throughout the world, hence it is not difficult to see why Wisconsin boasts hundreds of species. Over 500 kinds of insects in this group have been recorded, here, with more to be found.

All have a larval stage in which they are grub-like in appearance. A great variety of foods are eaten by larvae and adults depending upon the species. Some have chewing mouthparts and others have chewing and sucking mouthparts. Many species are large and very attractively colored.

Many have complex social systems in their colonies, such as ants and honey bees. There are harmful species that do considerable damage at times to forests (saw-flies) and lawns (certain ants). Bees, wasps and hornets are harmful in their ability to sting, but many of these are otherwise considered beneficial. Ichneumon wasps, braconid wasps and many other small species of this group are of great economic importance in that they kill countless other injurious insects. Many species pollenize flowers and hundreds of plants and therefore are very beneficial. All in all these insects are decidedly more beneficial than harmful. Typical are the honey bee, bald-faced hornet, ichneumon, sawfly braconid wasp and carpenter ant.

Tip to campers: since bees and wasps do have a painful sting, which can be dangerous for some susceptible individuals, it is wise to keep food (especially sweets and grease) and wastes undercover so that they do not attract the "stingers."

Millipedes and Centipedes

Millipedes or "thousand-leggers" number close to 150 species in North America, but the exact number to be found in Wisconsin is not known, though there are quite a few kinds. Millipedes live in damp places where they feed on decaying vegetation. When they are disturbed, they roll into a coil and often emit prussic acid from their glands, making them distasteful to their enemies. They are sometimes harmful to garden plants. Common garden millipede typical.

Centipedes are feared by many people as being deadly poisonous. This is not true, for the species found in Wisconsin or in North America for that matter cannot give you a deadly bite. They have poison glands and fangs, but these are effective only against the many insects, etc., that they prey upon. They are all fierce hunters and are found from the damp soils to the driest desert soils. There are relatively few species found in Wisconsin and they can be considered beneficial, since they destroy insects. Common garden centipede typical.

Crayfish, Water-fleas, Cyclops and Related Forms

This is a very large group of animals having dozens of species in Wisconsin. The common crayfish, or "crab," as many call it, is found in great numbers in most waters of the state. There is also a species that lives in the swamps and marshes where it constructs burrows with a "chimney" at the entrance. Crayfish feed on animal matter primarily. They are very important as food for fish and other animals and they are commonly used for bait by fishermen. Large ones can also be eaten and are very good. Common crayfish typical.

Most species belonging to this large group are very small animals living in great abundance in lakes and streams. They are water-fleas, cyclops, fresh-water shrimps, fairy shrimps and fish lice. They are of utmost importance in the food chain leading to the larger fish. One fertile lake may have billions of them in its waters, and if this is so, the fish reproduction and growth is assured. Common water-flea, fairy shrimp typical,

There are a number of different kinds of "sow-bugs" or "pill-bugs" as many people call woodlice. These are the small oval, jointed creatures that are commonly found under boards in damp situations and under old moist lumber, etc., in the basement of homes. Some people think they are "woodticks" but they are not. They feed on vegetable matter. Common sow-bug typical.

Clams, Snails and Related Forms

This large and important group contains various species which are water purifiers, food items for many animals, and important food for many people of various countries. Many of the larger species were a staple item in the diet of the American Indian.

The clams are known to everyone that has ever trodden a sandy lake or river shore. Many Wisconsin species are very large while others are relatively small. All constantly "siphon" water into their "strainers" and separate out the food particles for their use. The meat of the clam is often used as bait by fishermen and in the days of pearl buttons, the shells of these clams furnished the raw material. Some clams contain "fresh-water" pearls that are of considerable value if perfectly formed. Common clam typical.

Snails are represented in Wisconsin by many aquatic species and many land species. Almost any land area that has heavy vegetation and is usually damp will have great numbers of snails. The land snails are eagerly eaten by hundreds of species of land animals while the water snails play the same role in the aquatic animal kingdom.

Slugs or "slimy slugs" are actually snails without a shell. They occur in the same places as do the snails, but are probably more readily noticed because of their sliminess. The common garden slug is typical.

Earthworms and Leeches

Though most earthworms look alike, there are a number of different kinds in Wisconsin. Familiar to all is the common earthworm that is found in plowed field or spaded garden. Earthworms are perhaps one of the most beneficial of all animals to mankind, for their constant digestion of organic matter and mulching of the soil keeps this medium healthy and capable of producing food and fiber crops. Tons of earth per acre may be "reworked" each year by these creatures. They also furnish food to many animals and of course, are tops in "fishing bait." Common earthworm typical.

Leeches are close relatives of earthworms and are usually found in ponds where in some cases they may become very abundant. There are not many species of leeches in Wisconsin, but of the small variety, there are a few that are quite brightly colored. They are known for their blood-sucking habits and they are most commonly found on fishes, turtles etc. They will attach to man. The common medicinal leech is often used in hospitals for sucking bad blood from patients. Placobdella leech typical.

Roundworms

Most roundworms are parasitic in animals and some parasitize man, but there are many that are free-living. The parasitic ones often cause fatal diseases and are therefore of great importance. Free-living forms feed on animal and vegetable matter and sometimes cause damage to garden plants. Hookworm trichina, hairworm and "vinegar eel" typical.

Flatworms

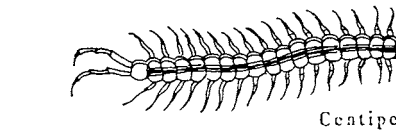
These worm-like animals have a great number of species, dozens of which are native to Wisconsin, and include planarians, flukes and tapeworms.

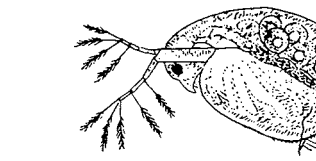
The planarians are free-living flatworms common in water and on moist soil. They are but little known to anyone but students of zoology, though they are very abundant. In general, they are small and light-colored, usually roughly lance-shaped and very flat. Common planarian typical.

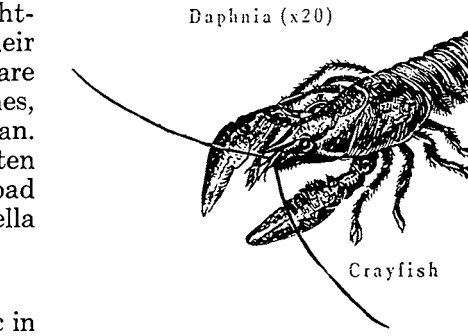
The flukes parasitize animals sometimes externally, but usually internally. Some reach 2-3 inches in length while others are very small. In general, they look like planarians except that they possess two or more suckers for attaching themselves to their hosts. They cause serious ailments in many animals and large infections of them can cause death. Liver fluke typical.

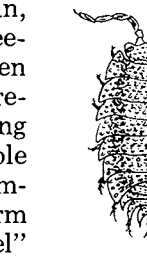
Tapeworms are sectional animals that also live a parasitic life in the

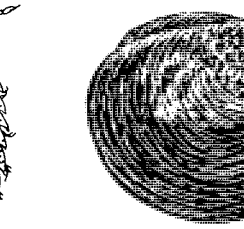

Millipede

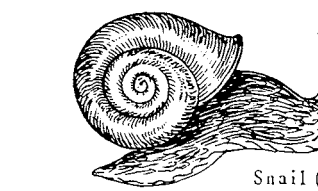

Centipede


Daphnia (x20)

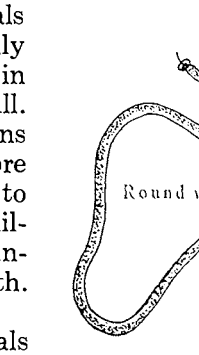

Crayfish

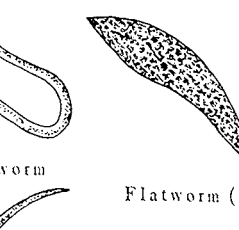

Sowbug (x2)


Clam

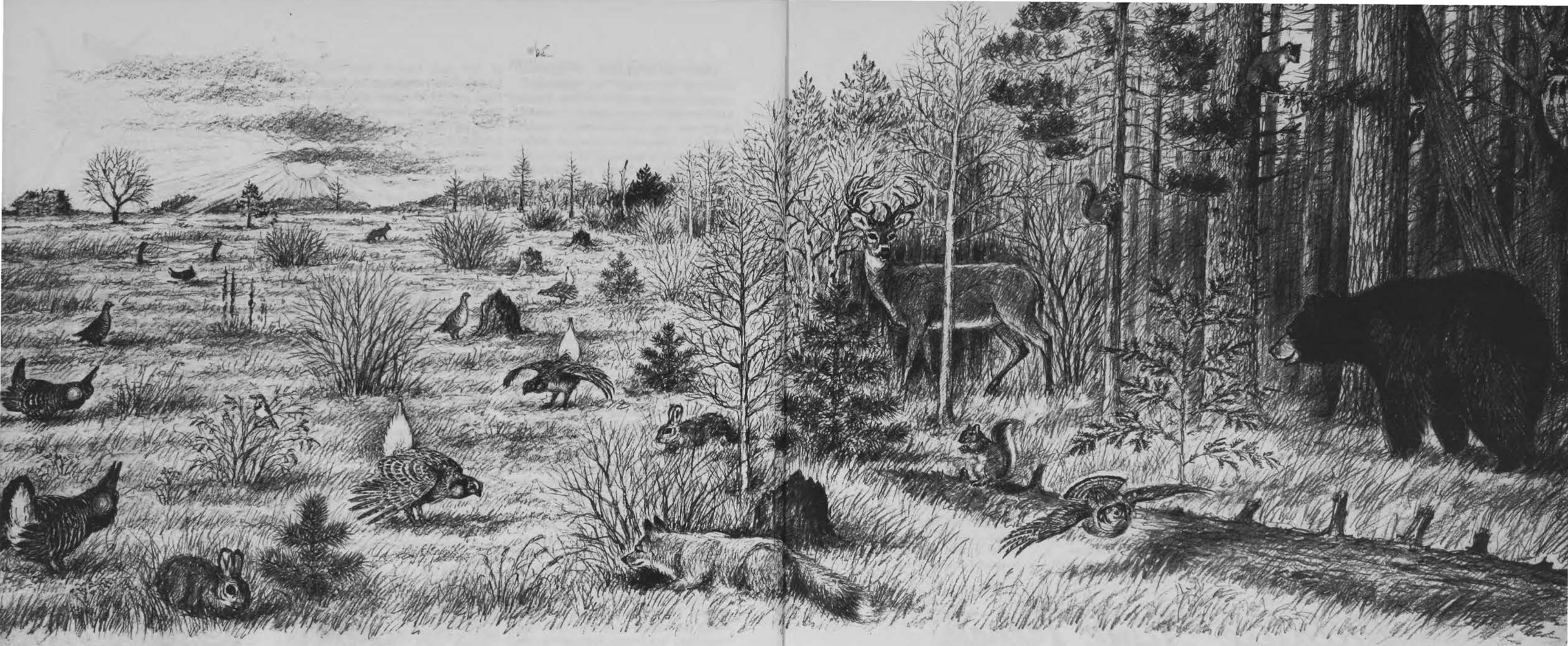

Snail (x1½)


Slug (x1½)


Round worm


Flatworm (x5)


Earthworm



Succession . . . the natural change in plant and animal communities over the years.

The artist has captured here an instant in the growth of a forest in northern Wisconsin. Let's look for a moment into the story packed into this one scene.

Just as the human community grows up and matures from shacks to skyscrapers, so the forest community grows up and matures from seedlings to sawtimber. The pioneering settlement of the forest is the open field, being invaded by brush and seedlings. Various stages replace one another — shrubs, seedlings and saplings, young trees — until the forest community is full-grown with large, mature trees.

And as the plants go, so go the animals. Each stage in the growth of the forest community has its own characteristic wildlife. There is some overlap, of course. A bear will amble out into the field to feed, a prairie chicken will sometimes roost along the edge of the woods. But by and large, we find prairie chickens in the open field, sharptails in the scattered brush area, deer, ruffed grouse, squirrel, fox and rabbit in the forest edge, and bear and marten in the mature forest. Take away one of these plant stages, and we will lose as well its wildlife inhabitants.

The greatest abundance of forest wildlife is not among the "skyscrapers" (as is the case with the inhabitants of the human community), but in the young and intermediate stages of community development. Therefore, in areas dedicated to game, we must often manipulate the forest habitat (as for example through cutting or burning) and *set back* the succession to the younger stages in order to maintain some of our major wildlife species.

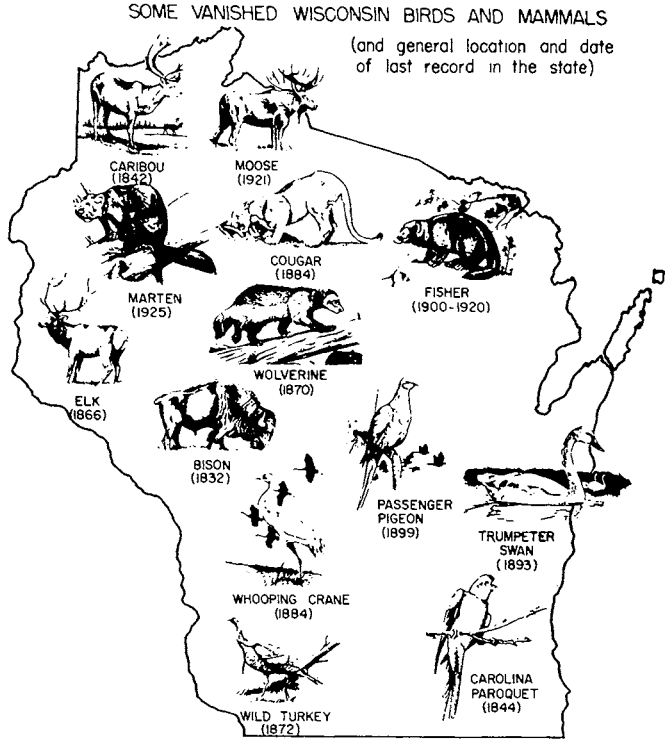
such as the coyote and spotted skunk. Some of these have been exotics — "foreigners" brought into the state as substitutes for native species. Others have been native animals re-introduced into Wisconsin. Repeated stocking attempts have been made with most of these animals. Occasionally the spark kindled and the species was successful in gaining a toe-hold; more often the species was not able to adapt to Wisconsin conditions and died out.

These changes in the wildlife community which have taken place have left Wisconsin with about the same number of *total species* but less big game animals and more kinds of fish and smaller birds. The numbers of some deep forest species have decreased, but many forest edge and farm game animals have increased, favored by the "opening up" of the country by settlement. *The future of wildlife animals, however, depends now on the integration of their management with land-use practices.*

As far as is known, there are no records of any well-known fish becoming extinct. However, some fish such as brook trout have lost their native home in entire regions of the state because of siltation, pollution and loss of water quality due to changes in cover and land use. Fish are more adaptable to unfavorable conditions than are game birds and mammals. Since there is much scattered habitat in the waters of this state which is not apt to be uniformly destroyed, it is less likely that many species will disappear completely.

Presently threatened or rare animals. There are several species, some residents, some visitors, which are losing out in our state because their habitat is being destroyed or their small numbers are being reduced by man or other predators or other factors. Of particular interest are: timber wolf, Canada lynx, white-fronted goose, spruce grouse, prairie chicken, sharp-tailed grouse, duck hawk, whooping crane, long-billed curlew, Hudsonian curlew, and lake-trout.

SOME VANISHED WISCONSIN BIRDS AND MAMMALS
(and general location and date of last record in the state)



MAMMALS, BIRDS AND FISH INTRODUCED BY MAN

Exotics Introduced	When*	Where	Successfully Established?
Pheasant	1916	Waukesha Co.	Yes
Hungarian partridge	1908	Waukesha Co.	Yes
Chukar partridge	1936	Sheboygan Co.	No
Valley quail	1935	?	No
Capercaillie and black grouse	1949	Outer Island (Experimental)	No
San Juan rabbit	1954	Manitowoc Co.	?
Rocky Mt. elk	1917	Vilas Co.	Killed Out
Carp	1884	?	Yes
Rainbow trout	1884	?	Yes
Brown trout	1886	?	Yes
Chinook salmon	1874	Lakes Mendota, Monona, Geneva	No
Coho salmon	1951	?	No
Atlantic salmon	1875	Elkhart, Cedar, Rock and Devil's Lakes	No
Lake Atlantic salmon	1875	Lakes Mendota and Oconomowoc	No
Cutthroat trout	1942	?	No
American grayling	1906	Lake Nebagamon	No
Natives Re-introduced			
Wild turkey	late 1930's; 1954, 1956	Sauk Co., Juneau Co.	No;?
Willow ptarmigan	1941	Wood Co.	No
Jackrabbit	1900	Waushara Co.	Yes
Marten	1953	Stockton Island	?
Fisher	1956	Nicolet Nat'l. Forest	?

* Many stocking attempts have been made with most species. Each date represents an early known record of an introduction.

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